

SEQUENCE LISTING

<110> Carulli, John P.
 Little, Randall D.
 Recker, Robert R.
 Johnson, Mark L.

<120> High bone mass gene of 11q13.3

<130> 032796-013

<140> US 09/544,398

<141> 2000-04-05

<150> US 09/229,319

<151> 1999-01-13

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<151> 1998-10-23

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<170> FastSEQ for Windows Version 4.0

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              Met Glu Ala Ala Pro Pro Gly Pro Pro Trp Pro Leu Leu
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ctg ctg ctg ctg ctg ctg ctg gcg ctg tgc ggc tgc ccg gcc ccc gcc      157
Leu Leu Leu Leu Leu Leu Leu Ala Leu Cys Gly Cys Pro Ala Pro Ala
    15              20              25
gcg gcc tcg ccg ctc ctg cta ttt gcc aac cgc cgg gac gta cgg ctg      205
Ala Ala Ser Pro Leu Leu Leu Phe Ala Asn Arg Arg Asp Val Arg Leu
    30              35              40              45
gtg gac gcc ggc gga gtc aag ctg gag tcc acc atc gtg gtc agc ggc      253
Val Asp Ala Gly Gly Val Lys Leu Glu Ser Thr Ile Val Val Ser Gly
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ctg gag gat gcg gcc gca gtg gac ttc cag ttt tcc aag gga gcc gtg      301
Leu Glu Asp Ala Ala Ala Val Asp Phe Gln Phe Ser Lys Gly Ala Val
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| tac tgg aca gac gtg agc gag gag gcc atc aag cag acc tac ctg aac | 349 |
| Tyr Trp Thr Asp Val Ser Glu Glu Ala Ile Lys Gln Thr Tyr Leu Asn | |
| 80 85 90 | |
| cag acg ggg gcc gcc gtg cag aac gtg gtc atc tcc ggc ctg gtc tct | 397 |
| Gln Thr Gly Ala Ala Val Gln Asn Val Val Ile Ser Gly Leu Val Ser | |
| 95 100 105 | |
| ccc gac ggc ctc gcc tgc gac tgg gtg ggc aag aag ctg tac tgg acg | 445 |
| Pro Asp Gly Leu Ala Cys Asp Trp Val Gly Lys Lys Leu Tyr Trp Thr | |
| 110 115 120 125 | |
| gac tca gag acc aac cgc atc gag gtg gcc aac ctc aat ggc aca tcc | 493 |
| Asp Ser Glu Thr Asn Arg Ile Glu Val Ala Asn Leu Asn Gly Thr Ser | |
| 130 135 140 | |
| cgg aag gtg ctc ttc tgg cag gac ctt gag cag ccg agg gcc atc gcc | 541 |
| Arg Lys Val Leu Phe Trp Gln Asp Leu Asp Gln Pro Arg Ala Ile Ala | |
| 145 150 155 | |
| ttg gac ccc gct cac ggg tac atg tac tgg aca gac tgg ggt gag acg | 589 |
| Leu Asp Pro Ala His Gly Tyr Met Tyr Trp Thr Asp Trp Gly Glu Thr | |
| 160 165 170 | |
| ccc cgg att gag cgg gca ggg atg gat ggc agc acc cgg aag atc att | 637 |
| Pro Arg Ile Glu Arg Ala Gly Met Asp Gly Ser Thr Arg Lys Ile Ile | |
| 175 180 185 | |
| gtg gac tcg gac att tac tgg ccc aat gga ctg acc atc gac ctg gag | 685 |
| Val Asp Ser Asp Ile Tyr Trp Pro Asn Gly Leu Thr Ile Asp Leu Glu | |
| 190 195 200 205 | |
| gag cag aag ctc tac tgg gct gac gcc aag ctc agc ttc atc cac cgt | 733 |
| Glu Gln Lys Leu Tyr Trp Ala Asp Ala Lys Leu Ser Phe Ile His Arg | |
| 210 215 220 | |
| gcc aac ctg gac ggc tcg ttc cgg cag aag gtg gtg gag ggc agc ctg | 781 |
| Ala Asn Leu Asp Gly Ser Phe Arg Gln Lys Val Val Glu Gly Ser Leu | |
| 225 230 235 | |
| acg cac ccc ttc gcc ctg acg ctc tcc ggg gac act ctg tac tgg aca | 829 |
| Thr His Pro Phe Ala Leu Thr Leu Ser Gly Asp Thr Leu Tyr Trp Thr | |
| 240 245 250 | |
| gac tgg cag acc cgc tcc atc cat gcc tgc aac aag cgc act ggg ggg | 877 |
| Asp Trp Gln Thr Arg Ser Ile His Ala Cys Asn Lys Arg Thr Gly Gly | |
| 255 260 265 | |
| aag agg aag gag atc ctg agt gcc ctc tac tca ccc atg gac atc cag | 925 |
| Lys Arg Lys Glu Ile Leu Ser Ala Leu Tyr Ser Pro Met Asp Ile Gln | |
| 270 275 280 285 | |
| gtg ctg agc cag gag cgg cag cct ttc ttc cac act cgc tgt gag gag | 973 |
| Val Leu Ser Gln Glu Arg Gln Pro Phe Phe His Thr Arg Cys Glu Glu | |
| 290 295 300 | |
| gac aat ggc ggc tgc tcc cac ctg tgc ctg ctg tcc cca agc gag cct | 1021 |
| Asp Asn Gly Gly Cys Ser His Leu Cys Leu Leu Ser Pro Ser Glu Pro | |
| 305 310 315 | |
| ttc tac aca tgc gcc tgc ccc acg ggt gtg cag ctg cag gac aac ggc | 1069 |
| Phe Tyr Thr Cys Ala Cys Pro Thr Gly Val Gln Leu Gln Asp Asn Gly | |
| 320 325 330 | |
| agg acg tgt aag gca gga gcc gag gag gtg ctg ctg ctg gcc cgg cgg | 1117 |
| Arg Thr Cys Lys Ala Gly Ala Glu Glu Val Leu Leu Leu Ala Arg Arg | |

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| 335 | 340 | 345 | |
| acg gac cta cgg agg atc tcg ctg gac acg ccg gac ttc acc gac atc | | | 1165 |
| Thr Asp Leu Arg Arg Ile Ser Leu Asp Thr Pro Asp Phe Thr Asp Ile | | | |
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| gtg ctg cag gtg gac gac atc cgg cac gcc att gcc atc gac tac gac | | | 1213 |
| Val Leu Gln Val Asp Asp Ile Arg His Ala Ile Ala Ile Asp Tyr Asp | | | |
| 370 | 375 | 380 | |
| ccg cta gag ggc tat gtc tac tgg aca gat gac gag gtg cgg gcc atc | | | 1261 |
| Pro Leu Glu Gly Tyr Val Tyr Trp Thr Asp Asp Glu Val Arg Ala Ile | | | |
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| cgc agg gcg tac ctg gac ggg tct ggg gcg cag acg ctg gtc aac acc | | | 1309 |
| Arg Arg Ala Tyr Leu Asp Gly Ser Gly Ala Gln Thr Leu Val Asn Thr | | | |
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| gag atc aac gac ccc gat ggc atc gcg gtc gac tgg gtg gcc cga aac | | | 1357 |
| Glu Ile Asn Asp Pro Asp Gly Ile Ala Val Asp Trp Val Ala Arg Asn | | | |
| 415 | 420 | 425 | |
| ctc tac tgg acc gac acg ggc acg gac cgc atc gag gtg acg cgc ctc | | | 1405 |
| Leu Tyr Trp Thr Asp Thr Gly Thr Asp Arg Ile Glu Val Thr Arg Leu | | | |
| 430 | 435 | 440 | 445 |
| aac ggc acc tcc cgc aag atc ctg gtg tcg gag gac ctg gac gag ccc | | | 1453 |
| Asn Gly Thr Ser Arg Lys Ile Leu Val Ser Glu Asp Leu Asp Glu Pro | | | |
| 450 | 455 | 460 | |
| cga gcc atc gca ctg cac ccc gtg atg ggc ctc atg tac tgg aca gac | | | 1501 |
| Arg Ala Ile Ala Leu His Pro Val Met Gly Leu Met Tyr Trp Thr Asp | | | |
| 465 | 470 | 475 | |
| tgg gga gag aac cct aaa atc gag tgt gcc aac ttg gat ggg cag gag | | | 1549 |
| Trp Gly Glu Asn Pro Lys Ile Glu Cys Ala Asn Leu Asp Gly Gln Glu | | | |
| 480 | 485 | 490 | |
| cgg cgt gtg ctg gtc aat gcc tcc ctc ggg tgg ccc aac ggc ctg gcc | | | 1597 |
| Arg Arg Val Leu Val Asn Ala Ser Leu Gly Trp Pro Asn Gly Leu Ala | | | |
| 495 | 500 | 505 | |
| ctg gac ctg cag gag ggg aag ctc tac tgg gga gac gcc aag aca gac | | | 1645 |
| Leu Asp Leu Gln Glu Gly Lys Leu Tyr Trp Gly Asp Ala Lys Thr Asp | | | |
| 510 | 515 | 520 | 525 |
| aag atc gag gtg atc aat gtt gat ggg acg aag agg cgg acc ctc ctg | | | 1693 |
| Lys Ile Glu Val Ile Asn Val Asp Gly Thr Lys Arg Arg Thr Leu Leu | | | |
| 530 | 535 | 540 | |
| gag gac aag ctc ccg cac att ttc ggg ttc acg ctg ctg ggg gac ttc | | | 1741 |
| Glu Asp Lys Leu Pro His Ile Phe Gly Phe Thr Leu Leu Gly Asp Phe | | | |
| 545 | 550 | 555 | |
| atc tac tgg act gac tgg cag cgc cgc agc atc gag cgg gtg cac aag | | | 1789 |
| Ile Tyr Trp Thr Asp Trp Gln Arg Arg Ser Ile Glu Arg Val His Lys | | | |
| 560 | 565 | 570 | |
| gtc aag gcc agc cgg gac gtc atc att gac cag ctg ccc gac ctg atg | | | 1837 |
| Val Lys Ala Ser Arg Asp Val Ile Ile Asp Gln Leu Pro Asp Leu Met | | | |
| 575 | 580 | 585 | |
| ggg ctc aaa gct gtg aat gtg gcc aag gtc gtc gga acc aac ccg tgt | | | 1885 |
| Gly Leu Lys Ala Val Asn Val Ala Lys Val Val Gly Thr Asn Pro Cys | | | |
| 590 | 595 | 600 | 605 |
| gcg gac agg aac ggg ggg tgc agc cac ctg tgc ttc ttc aca ccc cac | | | 1933 |

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|---|------|
| Ala Asp Arg Asn Gly Gly Cys Ser His Leu Cys Phe Phe Thr Pro His | |
| 610 615 620 | |
| gca acc cgg tgt ggc tgc ccc atc ggc ctg gag ctg ctg agt gac atg | 1981 |
| Ala Thr Arg Cys Gly Cys Pro Ile Gly Leu Glu Leu Leu Ser Asp Met | |
| 625 630 635 | |
| aag acc tgc atc gtg cct gag gcc ttc ttg gtc ttc acc agc aga gcc | 2029 |
| Lys Thr Cys Ile Val Pro Glu Ala Phe Leu Val Phe Thr Ser Arg Ala | |
| 640 645 650 | |
| gcc atc cac agg atc tcc ctc gag acc aat aac aac gac gtg gcc atc | 2077 |
| Ala Ile His Arg Ile Ser Leu Glu Thr Asn Asn Asn Asp Val Ala Ile | |
| 655 660 665 | |
| ccg ctc acg ggc gtc aag gag gcc tca gcc ctg gac ttt gat gtg tcc | 2125 |
| Pro Leu Thr Gly Val Lys Glu Ala Ser Ala Leu Asp Phe Asp Val Ser | |
| 670 675 680 685 | |
| aac aac cac atc tac tgg aca gac gtc agc ctg aag acc atc agc cgc | 2173 |
| Asn Asn His Ile Tyr Trp Thr Asp Val Ser Leu Lys Thr Ile Ser Arg | |
| 690 695 700 | |
| gcc ttc atg aac ggg agc tcg gtg gag cac gtg gtg gag ttt ggc ctt | 2221 |
| Ala Phe Met Asn Gly Ser Ser Val Glu His Val Val Glu Phe Gly Leu | |
| 705 710 715 | |
| gac tac ccc gag ggc atg gcc gtt gac tgg atg ggc aag aac ctc tac | 2269 |
| Asp Tyr Pro Glu Gly Met Ala Val Asp Trp Met Gly Lys Asn Leu Tyr | |
| 720 725 730 | |
| tgg gcc gac act ggg acc aac aga atc gaa gtg gcg cgg ctg gac ggg | 2317 |
| Trp Ala Asp Thr Gly Thr Asn Arg Ile Glu Val Ala Arg Leu Asp Gly | |
| 735 740 745 | |
| cag ttc cgg caa gtc ctc gtg tgg agg gac ttg gac aac ccg agg tcg | 2365 |
| Gln Phe Arg Gln Val Leu Val Trp Arg Asp Leu Asp Asn Pro Arg Ser | |
| 750 755 760 765 | |
| ctg gcc ctg gat ccc acc aag ggc tac atc tac tgg acc gag tgg ggc | 2413 |
| Leu Ala Leu Asp Pro Thr Lys Gly Tyr Ile Tyr Trp Thr Glu Trp Gly | |
| 770 775 780 | |
| ggc aag ccg agg atc gtg cgg gcc ttc atg gac ggg acc aac tgc atg | 2461 |
| Gly Lys Pro Arg Ile Val Arg Ala Phe Met Asp Gly Thr Asn Cys Met | |
| 785 790 795 | |
| acg ctg gtg gac aag gtg ggc cgg gcc aac gac ctc acc att gac tac | 2509 |
| Thr Leu Val Asp Lys Val Gly Arg Ala Asn Asp Leu Thr Ile Asp Tyr | |
| 800 805 810 | |
| gct gac cag cgc ctc tac tgg acc gac ctg gac acc aac atg atc gag | 2557 |
| Ala Asp Gln Arg Leu Tyr Trp Thr Asp Leu Asp Thr Asn Met Ile Glu | |
| 815 820 825 | |
| tcg tcc aac atg ctg ggt cag gag cgg gtc gtg att gcc gac gat ctc | 2605 |
| Ser Ser Asn Met Leu Gly Gln Glu Arg Val Val Ile Ala Asp Asp Leu | |
| 830 835 840 845 | |
| ccg cac ccg ttc ggt ctg acg cag tac agc gat tat atc tac tgg aca | 2653 |
| Pro His Pro Phe Gly Leu Thr Gln Tyr Ser Asp Tyr Ile Tyr Trp Thr | |
| 850 855 860 | |
| gac tgg aat ctg cac agc att gag cgg gcc gac aag act agc ggc cgg | 2701 |
| Asp Trp Asn Leu His Ser Ile Glu Arg Ala Asp Lys Thr Ser Gly Arg | |
| 865 870 875 | |

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| aac cgc acc ctc atc cag ggc cac ctg gac ttc gtg atg gac atc ctg | 2749 |
| Asn Arg Thr Leu Ile Gln Gly His Leu Asp Phe Val Met Asp Ile Leu | |
| 880 885 890 | |
| gtg ttc cac tcc tcc cgc cag gat ggc ctc aat gac tgt atg cac aac | 2797 |
| Val Phe His Ser Ser Arg Gln Asp Gly Leu Asn Asp Cys Met His Asn | |
| 895 900 905 | |
| aac ggg cag tgt ggg cag ctg tgc ctt gcc atc ccc ggc ggc cac cgc | 2845 |
| Asn Gly Gln Cys Gly Gln Leu Cys Leu Ala Ile Pro Gly Gly His Arg | |
| 910 915 920 925 | |
| tgc ggc tgc gcc tca cac tac acc ctg gac ccc agc agc cgc aac tgc | 2893 |
| Cys Gly Cys Ala Ser His Tyr Thr Leu Asp Pro Ser Ser Arg Asn Cys | |
| 930 935 940 | |
| agc ccg ccc acc acc ttc ttg ctg ttc agc cag aaa tct gcc atc agt | 2941 |
| Ser Pro Pro Thr Thr Phe Leu Leu Phe Ser Gln Lys Ser Ala Ile Ser | |
| 945 950 955 | |
| cgg atg atc ccg gac gac cag cac agc ccg gat ctc atc ctg ccc ctg | 2989 |
| Arg Met Ile Pro Asp Asp Gln His Ser Pro Asp Leu Ile Leu Pro Leu | |
| 960 965 970 | |
| cat gga ctg agg aac gtc aaa gcc atc gac tat gac cca ctg gac aag | 3037 |
| His Gly Leu Arg Asn Val Lys Ala Ile Asp Tyr Asp Pro Leu Asp Lys | |
| 975 980 985 | |
| ttc atc tac tgg gtg gat ggg cgc cag aac atc aag cga gcc aag gac | 3085 |
| Phe Ile Tyr Trp Val Asp Gly Arg Gln Asn Ile Lys Arg Ala Lys Asp | |
| 990 995 1000 1005 | |
| gac ggg acc cag ccc ttt gtt ttg acc tct ctg agc caa ggc caa aac | 3133 |
| Asp Gly Thr Gln Pro Phe Val Leu Thr Ser Leu Ser Gln Gly Gln Asn | |
| 1010 1015 1020 | |
| cca gac agg cag ccc cac gac ctc agc atc gac atc tac agc cgg aca | 3181 |
| Pro Asp Arg Gln Pro His Asp Leu Ser Ile Asp Ile Tyr Ser Arg Thr | |
| 1025 1030 1035 | |
| ctg ttc tgg acg tgc gag gcc acc aat acc atc aac gtc cac agg ctg | 3229 |
| Leu Phe Trp Thr Cys Glu Ala Thr Asn Thr Ile Asn Val His Arg Leu | |
| 1040 1045 1050 | |
| agc ggg gaa gcc atg ggg gtg gtg ctg cgt ggg gac cgc gac aag ccc | 3277 |
| Ser Gly Glu Ala Met Gly Val Val Leu Arg Gly Asp Arg Asp Lys Pro | |
| 1055 1060 1065 | |
| agg gcc atc gtc gtc aac gcg gag cga ggg tac ctg tac ttc acc aac | 3325 |
| Arg Ala Ile Val Val Asn Ala Glu Arg Gly Tyr Leu Tyr Phe Thr Asn | |
| 1070 1075 1080 1085 | |
| atg cag gac cgg gca gcc aag atc gaa cgc gca gcc ctg gac ggc acc | 3373 |
| Met Gln Asp Arg Ala Ala Lys Ile Glu Arg Ala Ala Leu Asp Gly Thr | |
| 1090 1095 1100 | |
| gag cgc gag gtc ctc ttc acc acc ggc ctc atc cgc cct gtg gcc ctg | 3421 |
| Glu Arg Glu Val Leu Phe Thr Thr Gly Leu Ile Arg Pro Val Ala Leu | |
| 1105 1110 1115 | |
| gtg gtg gac aac aca ctg ggc aag ctg ttc tgg gtg gac gcg gac ctg | 3469 |
| Val Val Asp Asn Thr Leu Gly Lys Leu Phe Trp Val Asp Ala Asp Leu | |
| 1120 1125 1130 | |
| aag cgc att gag agc tgt gac ctg tca ggg gcc aac cgc ctg acc ctg | 3517 |
| Lys Arg Ile Glu Ser Cys Asp Leu Ser Gly Ala Asn Arg Leu Thr Leu | |

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| 1135 | 1140 | 1145 | |
| gag gac gcc aac atc gtg cag cct ctg ggc ctg acc atc ctt ggc aag | | | 3565 |
| Glu Asp Ala Asn Ile Val Gln Pro Leu Gly Leu Thr Ile Leu Gly Lys | | | |
| 1150 | 1155 | 1160 | 1165 |
| cat ctc tac tgg atc gac cgc cag cag cag atg atc gag cgt gtg gag | | | 3613 |
| His Leu Tyr Trp Ile Asp Arg Gln Gln Gln Met Ile Glu Arg Val Glu | | | |
| 1170 | 1175 | 1180 | |
| aag acc acc ggg gac aag cgg act cgc atc cag ggc cgt gtc gcc cac | | | 3661 |
| Lys Thr Thr Gly Asp Lys Arg Thr Arg Ile Gln Gly Arg Val Ala His | | | |
| 1185 | 1190 | 1195 | |
| ctc act ggc atc cat gca gtg gag gaa gtc agc ctg gag gag ttc tca | | | 3709 |
| Leu Thr Gly Ile His Ala Val Glu Glu Val Ser Leu Glu Glu Phe Ser | | | |
| 1200 | 1205 | 1210 | |
| gcc cac cca tgt gcc cgt gac aat ggt ggc tgc tcc cac atc tgt att | | | 3757 |
| Ala His Pro Cys Ala Arg Asp Asn Gly Gly Cys Ser His Ile Cys Ile | | | |
| 1215 | 1220 | 1225 | |
| gcc aag ggt gat ggg aca cca cgg tgc tca tgc cca gtc cac ctc gtg | | | 3805 |
| Ala Lys Gly Asp Gly Thr Pro Arg Cys Ser Cys Pro Val His Leu Val | | | |
| 1230 | 1235 | 1240 | 1245 |
| ctc ctg cag aac ctg ctg acc tgt gga gag ccg ccc acc tgc tcc ccg | | | 3853 |
| Leu Leu Gln Asn Leu Leu Thr Cys Gly Glu Pro Pro Thr Cys Ser Pro | | | |
| 1250 | 1255 | 1260 | |
| gac cag ttt gca tgt gcc aca ggg gag atc gac tgt atc ccc ggg gcc | | | 3901 |
| Asp Gln Phe Ala Cys Ala Thr Gly Glu Ile Asp Cys Ile Pro Gly Ala | | | |
| 1265 | 1270 | 1275 | |
| tgg cgc tgt gac ggc ttt ccc gag tgc gat gac cag agc gac gag gag | | | 3949 |
| Trp Arg Cys Asp Gly Phe Pro Glu Cys Asp Asp Gln Ser Asp Glu Glu | | | |
| 1280 | 1285 | 1290 | |
| ggc tgc ccc gtg tgc tcc gcc gcc cag ttc ccc tgc gcg cgg ggt cag | | | 3997 |
| Gly Cys Pro Val Cys Ser Ala Ala Gln Phe Pro Cys Ala Arg Gly Gln | | | |
| 1295 | 1300 | 1305 | |
| tgt gtg gac ctg cgc ctg cgc tgc gac ggc gag gca gac tgt cag gac | | | 4045 |
| Cys Val Asp Leu Arg Leu Arg Cys Asp Gly Glu Ala Asp Cys Gln Asp | | | |
| 1310 | 1315 | 1320 | 1325 |
| cgc tca gac gag gtg gac tgt gac gcc atc tgc ctg ccc aac cag ttc | | | 4093 |
| Arg Ser Asp Glu Val Asp Cys Asp Ala Ile Cys Leu Pro Asn Gln Phe | | | |
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| cgg tgt gcg agc ggc cag tgt gtc ctc atc aaa cag cag tgc gac tcc | | | 4141 |
| Arg Cys Ala Ser Gly Gln Cys Val Leu Ile Lys Gln Gln Cys Asp Ser | | | |
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| ttc ccc gac tgt atc gac ggc tcc gac gag ctc atg tgt gaa atc acc | | | 4189 |
| Phe Pro Asp Cys Ile Asp Gly Ser Asp Glu Leu Met Cys Glu Ile Thr | | | |
| 1360 | 1365 | 1370 | |
| aag ccg ccc tca gac gac agc ccg gcc cac agc agt gcc atc ggg ccc | | | 4237 |
| Lys Pro Pro Ser Asp Asp Ser Pro Ala His Ser Ser Ala Ile Gly Pro | | | |
| 1375 | 1380 | 1385 | |
| gtc att ggc atc atc ctc tct ctc ttc gtc atg ggt ggt gtc tat ttt | | | 4285 |
| Val Ile Gly Ile Ile Leu Ser Leu Phe Val Met Gly Gly Val Tyr Phe | | | |
| 1390 | 1395 | 1400 | 1405 |
| gtg tgc cag cgc gtg gtg tgc cag cgc tat gcg ggg gcc aac ggg ccc | | | 4333 |

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|---|------|
| Val Cys Gln Arg Val Val Cys Gln Arg Tyr Ala Gly Ala Asn Gly Pro | |
| 1410 1415 1420 | |
| ttc ccg cac gag tat gtc agc ggg acc ccg cac gtg ccc ctc aat ttc | 4381 |
| Phe Pro His Glu Tyr Val Ser Gly Thr Pro His Val Pro Leu Asn Phe | |
| 1425 1430 1435 | |
| ata gcc ccg ggc ggt tcc cag cat ggc ccc ttc aca ggc atc gca tgc | 4429 |
| Ile Ala Pro Gly Gly Ser Gln His Gly Pro Phe Thr Gly Ile Ala Cys | |
| 1440 1445 1450 | |
| gga aag tcc atg atg agc tcc gtg agc ctg atg ggg ggc cgg ggc ggg | 4477 |
| Gly Lys Ser Met Met Ser Ser Val Ser Leu Met Gly Gly Arg Gly Gly | |
| 1455 1460 1465 | |
| gtg ccc ctc tac gac cgg aac cac gtc aca ggg gcc tcg tcc agc agc | 4525 |
| Val Pro Leu Tyr Asp Arg Asn His Val Thr Gly Ala Ser Ser Ser Ser | |
| 1470 1475 1480 1485 | |
| tcg tcc agc acg aag gcc acg ctg tac ccg ccg atc ctg aac ccg ccg | 4573 |
| Ser Ser Ser Thr Lys Ala Thr Leu Tyr Pro Pro Ile Leu Asn Pro Pro | |
| 1490 1495 1500 | |
| ccc tcc ccg gcc acg gac ccc tcc ctg tac aac atg gac atg ttc tac | 4621 |
| Pro Ser Pro Ala Thr Asp Pro Ser Leu Tyr Asn Met Asp Met Phe Tyr | |
| 1505 1510 1515 | |
| tct tca aac att ccg gcc act gcg aga ccg tac agg ccc tac atc att | 4669 |
| Ser Ser Asn Ile Pro Ala Thr Ala Arg Pro Tyr Arg Pro Tyr Ile Ile | |
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| cga gga atg gcg ccc ccg acg acg ccc tgc agc acc gac gtg tgt gac | 4717 |
| Arg Gly Met Ala Pro Pro Thr Thr Pro Cys Ser Thr Asp Val Cys Asp | |
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| Ser Asp Tyr Ser Ala Ser Arg Trp Lys Ala Ser Lys Tyr Tyr Leu Asp | |
| 1550 1555 1560 1565 | |
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| Leu Asn Ser Asp Ser Asp Pro Tyr Pro Pro Pro Pro Thr Pro His Ser | |
| 1570 1575 1580 | |
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| Gln Tyr Leu Ser Ala Glu Asp Ser Cys Pro Pro Ser Pro Ala Thr Glu | |
| 1585 1590 1595 | |
| agg agc tac ttc cat ctc ttc ccg ccc cct ccg tcc ccc tgc acg gac | 4909 |
| Arg Ser Tyr Phe His Leu Phe Pro Pro Pro Pro Ser Pro Cys Thr Asp | |
| 1600 1605 1610 | |
| tca tcc tgacctcggc cgggccactc tggcttctct gtgccctgt aaatagtttt | 4965 |
| Ser Ser | |
| 1615 | |
| aaatatgaac aaagaaaaaa atatatttta tgatttaaaa aataaatata attgggattt | 5025 |
| taaaaacatg agaaatgtga actgtgatgg ggtgggcagg gctgggagaa ctttgtacag | 5085 |
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              Met Glu Ala Ala Pro Pro Gly Pro Pro Trp Pro Leu Leu
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ctg ctg ctg ctg ctg ctg ctg gcg ctg tgc ggc tgc ccg gcc ccc gcc      157
Leu Leu Leu Leu Leu Leu Leu Ala Leu Cys Gly Cys Pro Ala Pro Ala
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gcg gcc tcg ccg ctc ctg cta ttt gcc aac cgc cgg gac gta cgg ctg      205
Ala Ala Ser Pro Leu Leu Leu Phe Ala Asn Arg Arg Asp Val Arg Leu
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gtg gac gcc ggc gga gtc aag ctg gag tcc acc atc gtg gtc agc ggc      253
Val Asp Ala Gly Gly Val Lys Leu Glu Ser Thr Ile Val Val Ser Gly
              50                55                60
ctg gag gat gcg gcc gca gtg gac ttc cag ttt tcc aag gga gcc gtg      301
Leu Glu Asp Ala Ala Val Asp Phe Gln Phe Ser Lys Gly Ala Val
              65                70                75
tac tgg aca gac gtg agc gag gag gcc atc aag cag acc tac ctg aac      349
Tyr Trp Thr Asp Val Ser Glu Glu Ala Ile Lys Gln Thr Tyr Leu Asn
              80                85                90
cag acg ggg gcc gcc gtg cag aac gtg gtc atc tcc ggc ctg gtc tct      397
Gln Thr Gly Ala Ala Val Gln Asn Val Val Ile Ser Gly Leu Val Ser
              95                100                105
ccc gac ggc ctc gcc tgc gac tgg gtg ggc aag aag ctg tac tgg acg      445
Pro Asp Gly Leu Ala Cys Asp Trp Val Gly Lys Lys Leu Tyr Trp Thr
              110                115                120                125
gac tca gag acc aac cgc atc gag gtg gcc aac ctc aat ggc aca tcc      493
Asp Ser Glu Thr Asn Arg Ile Glu Val Ala Asn Leu Asn Gly Thr Ser
              130                135                140
cgg aag gtg ctc ttc tgg cag gac ctt gac cag ccg agg gcc atc gcc      541
Arg Lys Val Leu Phe Trp Gln Asp Leu Asp Gln Pro Arg Ala Ile Ala
              145                150                155
ttg gac ccc gct cac ggg tac atg tac tgg aca gac tgg gtt gag acg      589
Leu Asp Pro Ala His Gly Tyr Met Tyr Trp Thr Asp Trp Val Glu Thr
              160                165                170
ccc cgg att gag cgg gca ggg atg gat ggc agc acc cgg aag atc att      637
Pro Arg Ile Glu Arg Ala Gly Met Asp Gly Ser Thr Arg Lys Ile Ile
              175                180                185
gtg gac tcg gac att tac tgg ccc aat gga ctg acc atc gac ctg gag      685
Val Asp Ser Asp Ile Tyr Trp Pro Asn Gly Leu Thr Ile Asp Leu Glu
              190                195                200                205
gag cag aag ctc tac tgg gct gac gcc aag ctc agc ttc atc cac cgt      733
Glu Gln Lys Leu Tyr Trp Ala Asp Ala Lys Leu Ser Phe Ile His Arg
              210                215                220
gcc aac ctg gac ggc tcg ttc cgg cag aag gtg gtg gag ggc agc ctg      781
Ala Asn Leu Asp Gly Ser Phe Arg Gln Lys Val Val Glu Gly Ser Leu
              225                230                235
acg cac ccc ttc gcc ctg acg ctc tcc ggg gac act ctg tac tgg aca      829
Thr His Pro Phe Ala Leu Thr Leu Ser Gly Asp Thr Leu Tyr Trp Thr
              240                245                250

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|---|------|
| gac tgg cag acc cgc tcc atc cat gcc tgc aac aag cgc act ggg ggg | 877 |
| Asp Trp Gln Thr Arg Ser Ile His Ala Cys Asn Lys Arg Thr Gly Gly | |
| 255 260 265 | |
| aag agg aag gag atc ctg agt gcc ctc tac tca ccc atg gac atc cag | 925 |
| Lys Arg Lys Glu Ile Leu Ser Ala Leu Tyr Ser Pro Met Asp Ile Gln | |
| 270 275 280 285 | |
| gtg ctg agc cag gag cgg cag cct ttc ttc cac act cgc tgt gag gag | 973 |
| Val Leu Ser Gln Glu Arg Gln Pro Phe Phe His Thr Arg Cys Glu Glu | |
| 290 295 300 | |
| gac aat ggc ggc tgc tcc cac ctg tgc ctg ctg tcc cca agc gag cct | 1021 |
| Asp Asn Gly Gly Cys Ser His Leu Cys Leu Leu Ser Pro Ser Glu Pro | |
| 305 310 315 | |
| ttc tac aca tgc gcc tgc ccc acg ggt gtg cag ctg cag gac aac ggc | 1069 |
| Phe Tyr Thr Cys Ala Cys Pro Thr Gly Val Gln Leu Gln Asp Asn Gly | |
| 320 325 330 | |
| agg acg tgt aag gca gga gcc gag gag gtg ctg ctg ctg gcc cgg cgg | 1117 |
| Arg Thr Cys Lys Ala Gly Ala Glu Glu Val Leu Leu Ala Arg Arg | |
| 335 340 345 | |
| acg gac cta cgg agg atc tcg ctg gac acg ccg gac ttc acc gac atc | 1165 |
| Thr Asp Leu Arg Arg Ile Ser Leu Asp Thr Pro Asp Phe Thr Asp Ile | |
| 350 355 360 365 | |
| gtg ctg cag gtg gac gac atc cgg cac gcc att gcc atc gac tac gac | 1213 |
| Val Leu Gln Val Asp Asp Ile Arg His Ala Ile Ala Ile Asp Tyr Asp | |
| 370 375 380 | |
| ccg cta gag ggc tat gtc tac tgg aca gat gac gag gtg cgg gcc atc | 1261 |
| Pro Leu Glu Gly Tyr Val Tyr Trp Thr Asp Asp Glu Val Arg Ala Ile | |
| 385 390 395 | |
| cgc agg gcg tac ctg gac ggg tct ggg gcg cag acg ctg gtc aac acc | 1309 |
| Arg Arg Ala Tyr Leu Asp Gly Ser Gly Ala Gln Thr Leu Val Asn Thr | |
| 400 405 410 | |
| gag atc aac gac ccc gat ggc atc gcg gtc gac tgg gtg gcc cga aac | 1357 |
| Glu Ile Asn Asp Pro Asp Gly Ile Ala Val Asp Trp Val Ala Arg Asn | |
| 415 420 425 | |
| ctc tac tgg acc gac acg ggc acg gac cgc atc gag gtg acg cgc ctc | 1405 |
| Leu Tyr Trp Thr Asp Thr Gly Thr Asp Arg Ile Glu Val Thr Arg Leu | |
| 430 435 440 445 | |
| aac ggc acc tcc cgc aag atc ctg gtg tcg gag gac ctg gac gag ccc | 1453 |
| Asn Gly Thr Ser Arg Lys Ile Leu Val Ser Glu Asp Leu Asp Glu Pro | |
| 450 455 460 | |
| cga gcc atc gca ctg cac ccc gtg atg ggc ctc atg tac tgg aca gac | 1501 |
| Arg Ala Ile Ala Leu His Pro Val Met Gly Leu Met Tyr Trp Thr Asp | |
| 465 470 475 | |
| tgg gga gag aac cct aaa atc gag tgt gcc aac ttg gat ggg cag gag | 1549 |
| Trp Gly Glu Asn Pro Lys Ile Glu Cys Ala Asn Leu Asp Gly Gln Glu | |
| 480 485 490 | |
| cgg cgt gtg ctg gtc aat gcc tcc ctc ggg tgg ccc aac ggc ctg gcc | 1597 |
| Arg Arg Val Leu Val Asn Ala Ser Leu Gly Trp Pro Asn Gly Leu Ala | |
| 495 500 505 | |
| ctg gac ctg cag gag ggg aag ctc tac tgg gga gac gcc aag aca gac | 1645 |
| Leu Asp Leu Gln Glu Gly Lys Leu Tyr Trp Gly Asp Ala Lys Thr Asp | |

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|---|-----|-----|-----|-----|-----|-----|------|
| 510 | | 515 | | 520 | | 525 | |
| aag atc gag gtg atc aat gtt gat ggg acg aag agg cgg acc ctc ctg | | | | | | | 1693 |
| Lys Ile Glu Val Ile Asn Val Asp Gly Thr Lys Arg Arg Thr Leu Leu | | | | | | | |
| | 530 | | 535 | | 540 | | |
| gag gac aag ctc ccg cac att ttc ggg ttc acg ctg ctg ggg gac ttc | | | | | | | 1741 |
| Glu Asp Lys Leu Pro His Ile Phe Gly Phe Thr Leu Leu Gly Asp Phe | | | | | | | |
| | 545 | | 550 | | 555 | | |
| atc tac tgg act gac tgg cag cgc cgc agc atc gag cgg gtg cac aag | | | | | | | 1789 |
| Ile Tyr Trp Thr Asp Trp Gln Arg Arg Ser Ile Glu Arg Val His Lys | | | | | | | |
| | 560 | | 565 | | 570 | | |
| gtc aag gcc agc cgg gac gtc atc att gac cag ctg ccc gac ctg atg | | | | | | | 1837 |
| Val Lys Ala Ser Arg Asp Val Ile Ile Asp Gln Leu Pro Asp Leu Met | | | | | | | |
| | 575 | | 580 | | 585 | | |
| ggg ctc aaa gct gtg aat gtg gcc aag gtc gtc gga acc aac ccg tgt | | | | | | | 1885 |
| Gly Leu Lys Ala Val Asn Val Ala Lys Val Val Gly Thr Asn Pro Cys | | | | | | | |
| | 590 | | 595 | | 600 | | 605 |
| gcg gac agg aac ggg ggg tgc agc cac ctg tgc ttc ttc aca ccc cac | | | | | | | 1933 |
| Ala Asp Arg Asn Gly Gly Cys Ser His Leu Cys Phe Phe Thr Pro His | | | | | | | |
| | 610 | | 615 | | 620 | | |
| gca acc cgg tgt ggc tgc ccc atc ggc ctg gag ctg ctg agt gac atg | | | | | | | 1981 |
| Ala Thr Arg Cys Gly Cys Pro Ile Gly Leu Glu Leu Leu Ser Asp Met | | | | | | | |
| | 625 | | 630 | | 635 | | |
| aag acc tgc atc gtg cct gag gcc ttc ttg gtc ttc acc agc aga gcc | | | | | | | 2029 |
| Lys Thr Cys Ile Val Pro Glu Ala Phe Leu Val Phe Thr Ser Arg Ala | | | | | | | |
| | 640 | | 645 | | 650 | | |
| gcc atc cac agg atc tcc ctc gag acc aat aac aac gac gtg gcc atc | | | | | | | 2077 |
| Ala Ile His Arg Ile Ser Leu Glu Thr Asn Asn Asn Asp Val Ala Ile | | | | | | | |
| | 655 | | 660 | | 665 | | |
| ccg ctc acg ggc gtc aag gag gcc tca gcc ctg gac ttt gat gtg tcc | | | | | | | 2125 |
| Pro Leu Thr Gly Val Lys Glu Ala Ser Ala Leu Asp Phe Asp Val Ser | | | | | | | |
| | 670 | | 675 | | 680 | | 685 |
| aac aac cac atc tac tgg aca gac gtc agc ctg aag acc atc agc cgc | | | | | | | 2173 |
| Asn Asn His Ile Tyr Trp Thr Asp Val Ser Leu Lys Thr Ile Ser Arg | | | | | | | |
| | 690 | | 695 | | 700 | | |
| gcc ttc atg aac ggg agc tcg gtg gag cac gtg gtg gag ttt ggc ctt | | | | | | | 2221 |
| Ala Phe Met Asn Gly Ser Ser Val Glu His Val Val Glu Phe Gly Leu | | | | | | | |
| | 705 | | 710 | | 715 | | |
| gac tac ccc gag ggc atg gcc gtt gac tgg atg ggc aag aac ctc tac | | | | | | | 2269 |
| Asp Tyr Pro Glu Gly Met Ala Val Asp Trp Met Gly Lys Asn Leu Tyr | | | | | | | |
| | 720 | | 725 | | 730 | | |
| tgg gcc gac act ggg acc aac aga atc gaa gtg gcg cgg ctg gac ggg | | | | | | | 2317 |
| Trp Ala Asp Thr Gly Thr Asn Arg Ile Glu Val Ala Arg Leu Asp Gly | | | | | | | |
| | 735 | | 740 | | 745 | | |
| cag ttc cgg caa gtc ctc gtg tgg agg gac ttg gac aac ccg agg tcg | | | | | | | 2365 |
| Gln Phe Arg Gln Val Leu Val Trp Arg Asp Leu Asp Asn Pro Arg Ser | | | | | | | |
| | 750 | | 755 | | 760 | | 765 |
| ctg gcc ctg gat ccc acc aag ggc tac atc tac tgg acc gag tgg ggc | | | | | | | 2413 |
| Leu Ala Leu Asp Pro Thr Lys Gly Tyr Ile Tyr Trp Thr Glu Trp Gly | | | | | | | |
| | 770 | | 775 | | 780 | | |
| ggc aag ccg agg atc gtg cgg gcc ttc atg gac ggg acc aac tgc atg | | | | | | | 2461 |

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|-----|-----|------|------|-----|-----|------|------|------|-----|-----|------|-----|------|-----|------|------|
| Gly | Lys | Pro | Arg | Ile | Val | Arg | Ala | Phe | Met | Asp | Gly | Thr | Asn | Cys | Met | |
| | | | 785 | | | | | 790 | | | | | 795 | | | |
| acg | ctg | gtg | gac | aag | gtg | ggc | cgg | gcc | aac | gac | ctc | acc | att | gac | tac | 2509 |
| Thr | Leu | Val | Asp | Lys | Val | Gly | Arg | Ala | Asn | Asp | Leu | Thr | Ile | Asp | Tyr | |
| | | 800 | | | | | 805 | | | | | 810 | | | | |
| gct | gac | cag | cgc | ctc | tac | tgg | acc | gac | ctg | gac | acc | aac | atg | atc | gag | 2557 |
| Ala | Asp | Gln | Arg | Leu | Tyr | Trp | Thr | Asp | Leu | Asp | Thr | Asn | Met | Ile | Glu | |
| | | 815 | | | | 820 | | | | | 825 | | | | | |
| tcg | tcc | aac | atg | ctg | ggc | cag | gag | cgg | gtc | gtg | att | gcc | gac | gat | ctc | 2605 |
| Ser | Ser | Asn | Met | Leu | Gly | Gln | Glu | Arg | Val | Val | Ile | Ala | Asp | Asp | Leu | |
| 830 | | | | | 835 | | | | 840 | | | | | | 845 | |
| ccg | cac | ccg | ttc | ggc | ctg | acg | cag | tac | agc | gat | tat | atc | tac | tgg | aca | 2653 |
| Pro | His | Pro | Phe | Gly | Leu | Thr | Gln | Tyr | Ser | Asp | Tyr | Ile | Tyr | Trp | Thr | |
| | | | 850 | | | | | 855 | | | | | | 860 | | |
| gac | tgg | aac | ctg | cac | agc | att | gag | cgg | gcc | gac | aag | act | agc | ggc | cgg | 2701 |
| Asp | Trp | Asn | Leu | His | Ser | Ile | Glu | Arg | Ala | Asp | Lys | Thr | Ser | Gly | Arg | |
| | | 865 | | | | | 870 | | | | | 875 | | | | |
| aac | cgc | acc | ctc | atc | cag | ggc | cac | ctg | gac | ttc | gtg | atg | gac | atc | ctg | 2749 |
| Asn | Arg | Thr | Leu | Ile | Gln | Gly | His | Leu | Asp | Phe | Val | Met | Asp | Ile | Leu | |
| | | 880 | | | | 885 | | | | | 890 | | | | | |
| gtg | ttc | cac | tcc | tcc | cgc | cag | gat | ggc | ctc | aac | gac | tgt | atg | cac | aac | 2797 |
| Val | Phe | His | Ser | Ser | Arg | Gln | Asp | Gly | Leu | Asn | Asp | Cys | Met | His | Asn | |
| | 895 | | | | 900 | | | | | 905 | | | | | | |
| aac | ggg | cag | tgt | ggg | cag | ctg | tgc | ctt | gcc | atc | ccc | ggc | ggc | cac | cgc | 2845 |
| Asn | Gly | Gln | Cys | Gly | Gln | Leu | Cys | Leu | Ala | Ile | Pro | Gly | Gly | His | Arg | |
| 910 | | | | | 915 | | | | 920 | | | | | | 925 | |
| tgc | ggc | tgc | gcc | tca | cac | tac | acc | ctg | gac | ccc | agc | agc | cgc | aac | tgc | 2893 |
| Cys | Gly | Cys | Ala | Ser | His | Tyr | Thr | Leu | Asp | Pro | Ser | Ser | Arg | Asn | Cys | |
| | | | 930 | | | | | 935 | | | | | 940 | | | |
| agc | ccg | ccc | acc | acc | ttc | ttg | ctg | ttc | agc | cag | aaa | tct | gcc | atc | agt | 2941 |
| Ser | Pro | Pro | Thr | Thr | Phe | Leu | Leu | Phe | Ser | Gln | Lys | Ser | Ala | Ile | Ser | |
| | | 945 | | | | | 950 | | | | | 955 | | | | |
| cgg | atg | atc | ccg | gac | gac | cag | cac | agc | ccg | gat | ctc | atc | ctg | ccc | ctg | 2989 |
| Arg | Met | Ile | Pro | Asp | Asp | Gln | His | Ser | Pro | Asp | Leu | Ile | Leu | Pro | Leu | |
| | | 960 | | | | 965 | | | | | 970 | | | | | |
| cat | gga | ctg | agg | aac | gtc | aaa | gcc | atc | gac | tat | gac | cca | ctg | gac | aag | 3037 |
| His | Gly | Leu | Arg | Asn | Val | Lys | Ala | Ile | Asp | Tyr | Asp | Pro | Leu | Asp | Lys | |
| | 975 | | | | 980 | | | | | 985 | | | | | | |
| ttc | atc | tac | tgg | gtg | gat | ggg | cgc | cag | aac | atc | aag | cga | gcc | aag | gac | 3085 |
| Phe | Ile | Tyr | Trp | Val | Asp | Gly | Arg | Gln | Asn | Ile | Lys | Arg | Ala | Lys | Asp | |
| 990 | | | | 995 | | | | 1000 | | | | | | | 1005 | |
| gac | ggg | acc | cag | ccc | ttt | gtt | ttg | acc | tct | ctg | agc | caa | ggc | caa | aac | 3133 |
| Asp | Gly | Thr | Gln | Pro | Phe | Val | Leu | Thr | Ser | Leu | Ser | Gln | Gly | Gln | Asn | |
| | | | 1010 | | | | | 1015 | | | | | 1020 | | | |
| cca | gac | agg | cag | ccc | cac | gac | ctc | agc | atc | gac | atc | tac | agc | cgg | aca | 3181 |
| Pro | Asp | Arg | Gln | Pro | His | Asp | Leu | Ser | Ile | Asp | Ile | Tyr | Ser | Arg | Thr | |
| | | 1025 | | | | | 1030 | | | | 1035 | | | | | |
| ctg | ttc | tgg | acg | tgc | gag | gcc | acc | aac | acc | atc | aac | gtc | cac | agg | ctg | 3229 |
| Leu | Phe | Trp | Thr | Cys | Glu | Ala | Thr | Asn | Thr | Ile | Asn | Val | His | Arg | Leu | |
| | | 1040 | | | | 1045 | | | | | 1050 | | | | | |

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|---|------|
| agc ggg gaa gcc atg ggg gtg gtg ctg cgt ggg gac cgc gac aag ccc | 3277 |
| Ser Gly Glu Ala Met Gly Val Val Leu Arg Gly Asp Arg Asp Lys Pro | |
| 1055 1060 1065 | |
| agg gcc atc gtc gtc aac gcg gag cga ggg tac ctg tac ttc acc aac | 3325 |
| Arg Ala Ile Val Val Asn Ala Glu Arg Gly Tyr Leu Tyr Phe Thr Asn | |
| 1070 1075 1080 1085 | |
| atg cag gac cgg gca gcc aag atc gaa cgc gca gcc ctg gac ggc acc | 3373 |
| Met Gln Asp Arg Ala Ala Lys Ile Glu Arg Ala Ala Leu Asp Gly Thr | |
| 1090 1095 1100 | |
| gag cgc gag gtc ctc ttc acc acc ggc ctc atc cgc cct gtg gcc ctg | 3421 |
| Glu Arg Glu Val Leu Phe Thr Thr Gly Leu Ile Arg Pro Val Ala Leu | |
| 1105 1110 1115 | |
| gtg gtg gac aac aca ctg ggc aag ctg ttc tgg gtg gac gcg gac ctg | 3469 |
| Val Val Asp Asn Thr Leu Gly Lys Leu Phe Trp Val Asp Ala Asp Leu | |
| 1120 1125 1130 | |
| aag cgc att gag agc tgt gac ctg tca ggg gcc aac cgc ctg acc ctg | 3517 |
| Lys Arg Ile Glu Ser Cys Asp Leu Ser Gly Ala Asn Arg Leu Thr Leu | |
| 1135 1140 1145 | |
| gag gac gcc aac atc gtg cag cct ctg ggc ctg acc atc ctt ggc aag | 3565 |
| Glu Asp Ala Asn Ile Val Gln Pro Leu Gly Leu Thr Ile Leu Gly Lys | |
| 1150 1155 1160 1165 | |
| cat ctc tac tgg atc gac cgc cag cag cag atg atc gag cgt gtg gag | 3613 |
| His Leu Tyr Trp Ile Asp Arg Gln Gln Gln Met Ile Glu Arg Val Glu | |
| 1170 1175 1180 | |
| aag acc acc ggg gac aag cgg act cgc atc cag ggc cgt gtc gcc cac | 3661 |
| Lys Thr Thr Gly Asp Lys Arg Thr Arg Ile Gln Gly Arg Val Ala His | |
| 1185 1190 1195 | |
| ctc act ggc atc cat gca gtg gag gaa gtc agc ctg gag gag ttc tca | 3709 |
| Leu Thr Gly Ile His Ala Val Glu Glu Val Ser Leu Glu Glu Phe Ser | |
| 1200 1205 1210 | |
| gcc cac cca tgt gcc cgt gac aat ggt ggc tgc tcc cac atc tgt att | 3757 |
| Ala His Pro Cys Ala Arg Asp Asn Gly Gly Cys Ser His Ile Cys Ile | |
| 1215 1220 1225 | |
| gcc aag ggt gat ggg aca cca cgg tgc tca tgc cca gtc cac ctc gtg | 3805 |
| Ala Lys Gly Asp Gly Thr Pro Arg Cys Ser Cys Pro Val His Leu Val | |
| 1230 1235 1240 1245 | |
| ctc ctg cag aac ctg ctg acc tgt gga gag ccg ccc acc tgc tcc ccg | 3853 |
| Leu Leu Gln Asn Leu Leu Thr Cys Gly Glu Pro Pro Thr Cys Ser Pro | |
| 1250 1255 1260 | |
| gac cag ttt gca tgt gcc aca ggg gag atc gac tgt atc ccc ggg gcc | 3901 |
| Asp Gln Phe Ala Cys Ala Thr Gly Glu Ile Asp Cys Ile Pro Gly Ala | |
| 1265 1270 1275 | |
| tgg cgc tgt gac ggc ttt ccc gag tgc gat gac cag agc gac gag gag | 3949 |
| Trp Arg Cys Asp Gly Phe Pro Glu Cys Asp Asp Gln Ser Asp Glu Glu | |
| 1280 1285 1290 | |
| ggc tgc ccc gtg tgc tcc gcc gcc cag ttc ccc tgc gcg cgg ggt cag | 3997 |
| Gly Cys Pro Val Cys Ser Ala Ala Gln Phe Pro Cys Ala Arg Gly Gln | |
| 1295 1300 1305 | |
| tgt gtg gac ctg cgc ctg cgc tgc gac ggc gag gca gac tgt cag gac | 4045 |
| Cys Val Asp Leu Arg Leu Arg Cys Asp Gly Glu Ala Asp Cys Gln Asp | |

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|---|------|------|------|------|
| 1310 | 1315 | 1320 | 1325 | |
| cgc tca gac gag gtg gac tgt gac gcc atc tgc ctg ccc aac cag ttc | | | | 4093 |
| Arg Ser Asp Glu Val Asp Cys Asp Ala Ile Cys Leu Pro Asn Gln Phe | | | | |
| 1330 | 1335 | 1340 | | |
| cgg tgt gcg agc ggc cag tgt gtc ctc atc aaa cag cag tgc gac tcc | | | | 4141 |
| Arg Cys Ala Ser Gly Gln Cys Val Leu Ile Lys Gln Gln Cys Asp Ser | | | | |
| 1345 | 1350 | 1355 | | |
| ttc ccc gac tgt atc gac ggc tcc gac gag ctc atg tgt gaa atc acc | | | | 4189 |
| Phe Pro Asp Cys Ile Asp Gly Ser Asp Glu Leu Met Cys Glu Ile Thr | | | | |
| 1360 | 1365 | 1370 | | |
| aag ccg ccc tca gac gac agc ccg gcc cac agc agt gcc atc ggg ccc | | | | 4237 |
| Lys Pro Pro Ser Asp Asp Ser Pro Ala His Ser Ser Ala Ile Gly Pro | | | | |
| 1375 | 1380 | 1385 | | |
| gtc att ggc atc atc ctc tct ctc ttc gtc atg ggt ggt gtc tat ttt | | | | 4285 |
| Val Ile Gly Ile Ile Leu Ser Leu Phe Val Met Gly Gly Val Tyr Phe | | | | |
| 1390 | 1395 | 1400 | 1405 | |
| gtg tgc cag cgc gtg gtg tgc cag cgc tat gcg ggg gcc aac ggg ccc | | | | 4333 |
| Val Cys Gln Arg Val Val Cys Gln Arg Tyr Ala Gly Ala Asn Gly Pro | | | | |
| 1410 | 1415 | 1420 | | |
| ttc ccg cac gag tat gtc agc ggg acc ccg cac gtg ccc ctc aat ttc | | | | 4381 |
| Phe Pro His Glu Tyr Val Ser Gly Thr Pro His Val Pro Leu Asn Phe | | | | |
| 1425 | 1430 | 1435 | | |
| ata gcc ccg ggc ggt tcc cag cat ggc ccc ttc aca ggc atc gca tgc | | | | 4429 |
| Ile Ala Pro Gly Gly Ser Gln His Gly Pro Phe Thr Gly Ile Ala Cys | | | | |
| 1440 | 1445 | 1450 | | |
| gga aag tcc atg atg agc tcc gtg agc ctg atg ggg ggc cgg ggc ggg | | | | 4477 |
| Gly Lys Ser Met Met Ser Ser Val Ser Leu Met Gly Gly Arg Gly Gly | | | | |
| 1455 | 1460 | 1465 | | |
| gtg ccc ctc tac gac cgg aac cac gtc aca ggg gcc tcg tcc agc agc | | | | 4525 |
| Val Pro Leu Tyr Asp Arg Asn His Val Thr Gly Ala Ser Ser Ser Ser | | | | |
| 1470 | 1475 | 1480 | 1485 | |
| tcg tcc agc acg aag gcc acg ctg tac ccg ccg atc ctg aac ccg ccg | | | | 4573 |
| Ser Ser Ser Thr Lys Ala Thr Leu Tyr Pro Pro Ile Leu Asn Pro Pro | | | | |
| 1490 | 1495 | 1500 | | |
| ccc tcc ccg gcc acg gac ccc tcc ctg tac aac atg gac atg ttc tac | | | | 4621 |
| Pro Ser Pro Ala Thr Asp Pro Ser Leu Tyr Asn Met Asp Met Phe Tyr | | | | |
| 1505 | 1510 | 1515 | | |
| tct tca aac att ccg gcc act gcg aga ccg tac agg ccc tac atc att | | | | 4669 |
| Ser Ser Asn Ile Pro Ala Thr Ala Arg Pro Tyr Arg Pro Tyr Ile Ile | | | | |
| 1520 | 1525 | 1530 | | |
| cga gga atg gcg ccc ccg acg acg ccc tgc agc acc gac gtg tgt gac | | | | 4717 |
| Arg Gly Met Ala Pro Pro Thr Thr Pro Cys Ser Thr Asp Val Cys Asp | | | | |
| 1535 | 1540 | 1545 | | |
| agc gac tac agc gcc agc cgc tgg aag gcc agc aag tac tac ctg gat | | | | 4765 |
| Ser Asp Tyr Ser Ala Ser Arg Trp Lys Ala Ser Lys Tyr Tyr Leu Asp | | | | |
| 1550 | 1555 | 1560 | 1565 | |
| ttg aac tcg gac tca gac ccc tat cca ccc cca ccc acg ccc cac agc | | | | 4813 |
| Leu Asn Ser Asp Ser Asp Pro Tyr Pro Pro Pro Pro Thr Pro His Ser | | | | |
| 1570 | 1575 | 1580 | | |
| cag tac ctg tcg gcg gag gac agc tgc ccg ccc tcg ccc gcc acc gag | | | | 4861 |

| | |
|--|------|
| Gln Tyr Leu Ser Ala Glu Asp Ser Cys Pro Pro Ser Pro Ala Thr Glu | |
| 1585 1590 1595 | |
| agg agc tac ttc cat ctc ttc ccg ccc cct ccg tcc ccc tgc acg gac | 4909 |
| Arg Ser Tyr Phe His Leu Phe Pro Pro Pro Pro Ser Pro Cys Thr Asp | |
| 1600 1605 1610 | |
| tca tcc tgacctcggc cgggccactc tggcttctct gtgccctgt aaatagtttt | 4965 |
| Ser Ser | |
| 1615 | |
| aaatatgaac aaagaaaaaa atatatttta tgattttaaaa aataaatata attgggattt | 5025 |
| taaaaacatg agaaatgtga actgtgatgg ggtgggcagg gctgggagaa ctttgtacag | 5085 |
| tggagaaata ttataaaact taattttgta aaaca | 5120 |

<210> 3
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 <212> PRT
 <213> Homo sapiens

<400> 3

| | |
|---|--|
| Met Glu Ala Ala Pro Pro Gly Pro Pro Trp Pro Leu Leu Leu Leu Leu | |
| 1 5 10 15 | |
| Leu Leu Leu Leu Ala Leu Cys Gly Cys Pro Ala Pro Ala Ala Ser | |
| 20 25 30 | |
| Pro Leu Leu Leu Phe Ala Asn Arg Arg Asp Val Arg Leu Val Asp Ala | |
| 35 40 45 | |
| Gly Gly Val Lys Leu Glu Ser Thr Ile Val Val Ser Gly Leu Glu Asp | |
| 50 55 60 | |
| Ala Ala Ala Val Asp Phe Gln Phe Ser Lys Gly Ala Val Tyr Trp Thr | |
| 65 70 75 80 | |
| Asp Val Ser Glu Glu Ala Ile Lys Gln Thr Tyr Leu Asn Gln Thr Gly | |
| 85 90 95 | |
| Ala Ala Val Gln Asn Val Val Ile Ser Gly Leu Val Ser Pro Asp Gly | |
| 100 105 110 | |
| Leu Ala Cys Asp Trp Val Gly Lys Lys Leu Tyr Trp Thr Asp Ser Glu | |
| 115 120 125 | |
| Thr Asn Arg Ile Glu Val Ala Asn Leu Asn Gly Thr Ser Arg Lys Val | |
| 130 135 140 | |
| Leu Phe Trp Gln Asp Leu Asp Gln Pro Lys Ala Ile Ala Leu Asp Pro | |
| 145 150 155 160 | |
| Ala His Gly Tyr Met Tyr Trp Thr Asp Trp Gly Glu Thr Pro Arg Ile | |
| 165 170 175 | |
| Glu Arg Ala Gly Met Asp Gly Ser Thr Arg Lys Ile Ile Val Asp Ser | |
| 180 185 190 | |
| Asp Ile Tyr Trp Pro Asn Gly Leu Thr Ile Asp Leu Glu Glu Gln Lys | |
| 195 200 205 | |
| Leu Tyr Trp Ala Asp Ala Lys Leu Ser Phe Ile His Arg Ala Asn Leu | |
| 210 215 220 | |
| Asp Gly Ser Phe Arg Gln Lys Val Val Glu Gly Ser Leu Thr His Pro | |
| 225 230 235 240 | |
| Phe Ala Leu Thr Leu Ser Gly Asp Thr Leu Tyr Trp Thr Asp Trp Gln | |
| 245 250 255 | |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Arg | Ser | Ile | His | Ala | Cys | Asn | Lys | Arg | Thr | Gly | Gly | Lys | Arg | Lys | 260 | 265 | 270 |
| Glu | Ile | Leu | Ser | Ala | Leu | Tyr | Ser | Pro | Met | Asp | Ile | Gln | Val | Leu | Ser | 275 | 280 | 285 |
| Gln | Glu | Arg | Gln | Pro | Phe | Phe | His | Thr | Arg | Cys | Glu | Glu | Asp | Asn | Gly | 290 | 295 | 300 |
| Gly | Trp | Ser | His | Leu | Cys | Leu | Leu | Ser | Pro | Ser | Glu | Pro | Phe | Tyr | Thr | 305 | 310 | 315 |
| Cys | Ala | Cys | Pro | Thr | Gly | Val | Gln | Met | Gln | Asp | Asn | Gly | Arg | Thr | Cys | 325 | 330 | 335 |
| Lys | Ala | Gly | Ala | Glu | Glu | Val | Leu | Leu | Ala | Arg | Arg | Thr | Asp | Leu | | 340 | 345 | 350 |
| Arg | Arg | Ile | Ser | Leu | Asp | Thr | Pro | Asp | Phe | Thr | Asp | Ile | Val | Leu | Gln | 355 | 360 | 365 |
| Val | Asp | Asp | Ile | Arg | His | Ala | Ile | Ala | Ile | Asp | Tyr | Asp | Pro | Leu | Glu | 370 | 375 | 380 |
| Gly | Tyr | Val | Tyr | Trp | Thr | Asp | Asp | Glu | Val | Arg | Ala | Ile | Arg | Arg | Ala | 385 | 390 | 395 |
| Tyr | Leu | Asp | Gly | Ser | Gly | Ala | Gln | Thr | Leu | Val | Asn | Thr | Glu | Ile | Asn | 405 | 410 | 415 |
| Asp | Pro | Asp | Gly | Ile | Ala | Val | Asp | Trp | Val | Ala | Arg | Asn | Leu | Tyr | Trp | 420 | 425 | 430 |
| Thr | Asp | Thr | Gly | Thr | Asp | Arg | Ile | Glu | Val | Thr | Arg | Leu | Asn | Gly | Thr | 435 | 440 | 445 |
| Ser | Arg | Lys | Ile | Leu | Val | Ser | Glu | Asp | Leu | Asp | Glu | Pro | Arg | Ala | Ile | 450 | 455 | 460 |
| Ala | Leu | His | Pro | Val | Met | Gly | Leu | Met | Tyr | Trp | Thr | Asp | Trp | Gly | Glu | 465 | 470 | 475 |
| Asn | Pro | Lys | Ile | Glu | Cys | Ala | Asn | Leu | Asp | Gly | Gln | Glu | Arg | Arg | Val | 485 | 490 | 495 |
| Leu | Val | Asn | Ala | Ser | Leu | Gly | Trp | Pro | Asn | Gly | Leu | Ala | Leu | Asp | Leu | 500 | 505 | 510 |
| Gln | Glu | Gly | Lys | Leu | Tyr | Trp | Gly | Asp | Ala | Lys | Thr | Asp | Lys | Ile | Glu | 515 | 520 | 525 |
| Val | Ile | Asn | Val | Asp | Gly | Thr | Lys | Arg | Arg | Thr | Leu | Leu | Glu | Asp | Lys | 530 | 535 | 540 |
| Leu | Pro | His | Ile | Phe | Gly | Phe | Thr | Leu | Leu | Gly | Asp | Phe | Ile | Tyr | Trp | 545 | 550 | 555 |
| Thr | Asp | Trp | Gln | Arg | Arg | Ser | Ile | Glu | Arg | Val | His | Lys | Val | Lys | Ala | 565 | 570 | 575 |
| Ser | Arg | Asp | Val | Ile | Ile | Asp | Gln | Leu | Pro | Asp | Leu | Met | Gly | Leu | Lys | 580 | 585 | 590 |
| Ala | Val | Asn | Val | Ala | Lys | Val | Val | Gly | Thr | Asn | Pro | Cys | Ala | Asp | Arg | 595 | 600 | 605 |
| Asn | Gly | Gly | Cys | Ser | His | Leu | Cys | Phe | Phe | Thr | Pro | His | Ala | Thr | Arg | 610 | 615 | 620 |
| Cys | Gly | Cys | Pro | Ile | Gly | Leu | Glu | Leu | Leu | Ser | Asp | Met | Lys | Thr | Cys | 625 | 630 | 635 |
| Ile | Val | Pro | Glu | Ala | Phe | Leu | Val | Phe | Thr | Ser | Arg | Ala | Ala | Ile | His | 645 | 650 | 655 |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Arg | Ile | Ser | Leu | Glu | Thr | Asn | Asn | Asn | Asp | Val | Ala | Ile | Pro | Leu | Thr | 660 | 665 | 670 |
| Gly | Val | Lys | Glu | Ala | Ser | Ala | Leu | Asp | Phe | Asp | Val | Ser | Asn | Asn | His | 675 | 680 | 685 |
| Ile | Tyr | Trp | Thr | Asp | Val | Ser | Leu | Lys | Asn | Ile | Ser | Arg | Ala | Phe | Met | 690 | 695 | 700 |
| Asn | Gly | Ser | Ser | Val | Glu | His | Val | Val | Glu | Phe | Gly | Leu | Asp | Tyr | Pro | 705 | 710 | 715 |
| Glu | Gly | Met | Ala | Val | Asp | Trp | Met | Gly | Lys | Asn | Leu | Tyr | Trp | Ala | Asp | 725 | 730 | 735 |
| Thr | Gly | Thr | Asn | Arg | Ile | Glu | Val | Ala | Arg | Leu | Asp | Gly | Gln | Phe | Arg | 740 | 745 | 750 |
| Gln | Val | Leu | Val | Trp | Arg | Asp | Leu | Asp | Asn | Pro | Arg | Ser | Leu | Ala | Leu | 755 | 760 | 765 |
| Asp | Pro | Thr | Lys | Gly | Tyr | Ile | Tyr | Trp | Thr | Glu | Trp | Gly | Gly | Lys | Pro | 770 | 775 | 780 |
| Arg | Ile | Val | Arg | Ala | Phe | Met | Asp | Gly | Thr | Asn | Cys | Met | Thr | Leu | Val | 785 | 790 | 795 |
| Asp | Lys | Val | Gly | Arg | Ala | Asn | Asp | Leu | Thr | Ile | Asp | Tyr | Ala | Asp | Gln | 805 | 810 | 815 |
| Arg | Leu | Tyr | Trp | Thr | Asp | Leu | Asp | Thr | Asn | Met | Ile | Glu | Ser | Ser | Asn | 820 | 825 | 830 |
| Met | Leu | Gly | Gln | Glu | Arg | Val | Val | Ile | Ala | Asp | Asp | Leu | Pro | His | Pro | 835 | 840 | 845 |
| Phe | Gly | Leu | Thr | Gln | Tyr | Ser | Asp | Tyr | Ile | Tyr | Trp | Thr | Asp | Trp | Asn | 850 | 855 | 860 |
| Leu | His | Ser | Ile | Glu | Arg | Ala | Asp | Lys | Thr | Ser | Gly | Arg | Asn | Arg | Thr | 865 | 870 | 875 |
| Leu | Ile | Gln | Gly | His | Leu | Asp | Phe | Val | Met | Asp | Ile | Leu | Val | Phe | His | 885 | 890 | 895 |
| Ser | Ser | Arg | Gln | Asp | Gly | Leu | Asn | Asp | Cys | Met | His | Asn | Asn | Gly | Gln | 900 | 905 | 910 |
| Cys | Gly | Gln | Leu | Cys | Leu | Ala | Ile | Pro | Gly | Gly | His | Arg | Cys | Gly | Cys | 915 | 920 | 925 |
| Ala | Ser | His | Tyr | Thr | Leu | Asp | Pro | Ser | Ser | Arg | Asn | Cys | Ser | Pro | Pro | 930 | 935 | 940 |
| Thr | Thr | Phe | Leu | Leu | Phe | Ser | Gln | Lys | Ser | Ala | Ile | Ser | Arg | Met | Ile | 945 | 950 | 955 |
| Pro | Asp | Asp | Gln | His | Ser | Pro | Asp | Leu | Ile | Leu | Pro | Leu | His | Gly | Leu | 965 | 970 | 975 |
| Arg | Asn | Val | Lys | Ala | Ile | Asp | Tyr | Asp | Pro | Leu | Asp | Lys | Phe | Ile | Tyr | 980 | 985 | 990 |
| Trp | Val | Asp | Gly | Arg | Gln | Asn | Ile | Lys | Arg | Ala | Lys | Asp | Asp | Gly | Thr | 995 | 1000 | 1005 |
| Gln | Pro | Phe | Val | Leu | Thr | Ser | Leu | Ser | Gln | Gly | Gln | Asn | Pro | Asp | Arg | 1010 | 1015 | 1020 |
| Gln | Pro | His | Asp | Leu | Ser | Ile | Asp | Ile | Tyr | Ser | Arg | Thr | Leu | Phe | Trp | 1025 | 1030 | 1035 |
| Thr | Cys | Glu | Ala | Thr | Asn | Thr | Ile | Asn | Val | His | Arg | Leu | Ser | Gly | Glu | 1045 | 1050 | 1055 |

Ala Met Gly Val Val Leu Arg Gly Asp Arg Asp Lys Pro Arg Ala Ile
 1060 1065 1070
 Val Val Asn Ala Glu Arg Gly Tyr Leu Tyr Phe Thr Asn Met Gln Asp
 1075 1080 1085
 Arg Ala Ala Lys Ile Glu Arg Ala Ala Leu Asp Gly Thr Glu Arg Glu
 1090 1095 1100
 Val Leu Phe Thr Thr Gly Leu Ile Arg Pro Val Ala Leu Val Val Asp
 1105 1110 1115 1120
 Asn Thr Leu Gly Lys Leu Phe Trp Val Asp Ala Asp Leu Lys Arg Ile
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 Glu Ser Cys Asp Leu Ser Gly Ala Asn Arg Leu Thr Leu Glu Asp Ala
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 Asn Ile Val Gln Pro Leu Gly Leu Thr Ile Leu Gly Lys His Leu Tyr
 1155 1160 1165
 Trp Ile Asp Arg Gln Gln Gln Met Ile Glu Arg Val Glu Lys Thr Thr
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 Gly Asp Lys Arg Thr Arg Ile Gln Gly Arg Val Ala His Leu Thr Gly
 1185 1190 1195 1200
 Ile His Ala Val Glu Glu Val Ser Leu Glu Glu Phe Ser Ala His Pro
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 Cys Ala Arg Asp Asn Gly Gly Cys Ser His Ile Cys Ile Ala Lys Gly
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 Asp Gly Thr Pro Arg Cys Ser Cys Pro Val His Leu Val Leu Leu Gln
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 Asn Leu Leu Thr Cys Gly Glu Pro Pro Thr Cys Ser Pro Asp Gln Phe
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 1265 1270 1275 1280
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 Val Cys Ser Ala Ala Gln Phe Pro Cys Ala Arg Gly Gln Cys Val Asp
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 Leu Arg Leu Arg Cys Asp Gly Glu Ala Asp Cys Gln Asp Arg Ser Asp
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 Glu Val Asp Cys Asp Ala Ile Cys Leu Pro Asn Gln Phe Arg Cys Ala
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 Ser Gly Gln Cys Val Leu Ile Lys Gln Gln Cys Asp Ser Phe Pro Asp
 1345 1350 1355 1360
 Cys Ile Asp Gly Ser Asp Glu Leu Met Cys Glu Ile Thr Lys Pro Pro
 1365 1370 1375
 Ser Asp Asp Ser Pro Ala His Ser Ser Ala Ile Gly Pro Val Ile Gly
 1380 1385 1390
 Ile Ile Leu Ser Leu Phe Val Met Gly Gly Val Tyr Phe Val Cys Gln
 1395 1400 1405
 Arg Val Val Cys Gln Arg Tyr Ala Gly Ala Asn Gly Pro Phe Pro His
 1410 1415 1420
 Glu Tyr Val Ser Gly Thr Pro His Val Pro Leu Asn Phe Ile Ala Pro
 1425 1430 1435 1440
 Gly Gly Ser Gln His Gly Pro Phe Thr Gly Ile Ala Cys Gly Lys Ser
 1445 1450 1455

Met Met Ser Ser Val Ser Leu Met Gly Gly Arg Gly Gly Val Pro Leu
 1460 1465 1470
 Tyr Asp Arg Asn His Val Thr Gly Ala Ser Ser Ser Ser Ser Ser
 1475 1480 1485
 Thr Lys Ala Thr Leu Tyr Pro Pro Ile Leu Asn Pro Pro Pro Ser Pro
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 Ala Thr Asp Pro Ser Leu Tyr Asn Met Asp Met Phe Tyr Ser Ser Asn
 1505 1510 1515 1520
 Ile Pro Ala Thr Ala Arg Pro Tyr Arg Pro Tyr Ile Ile Arg Gly Met
 1525 1530 1535
 Ala Pro Pro Thr Pro Cys Ser Thr Asp Val Cys Asp Ser Asp Tyr
 1540 1545 1550
 Ser Ala Ser Arg Trp Lys Ala Ser Lys Tyr Tyr Leu Asp Leu Asn Ser
 1555 1560 1565
 Asp Ser Asp Pro Tyr Pro Pro Pro Thr Pro His Ser Gln Tyr Leu
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 Ser Ala Glu Asp Ser Cys Pro Pro Ser Pro Ala Thr Glu Arg Ser Tyr
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 Phe His Leu Phe Pro Pro Pro Ser Pro Cys Thr Asp Ser Ser
 1605 1610 1615

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<400> 4
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 Pro Leu Leu Leu Phe Ala Asn Arg Arg Asp Val Arg Leu Val Asp Ala
 35 40 45
 Gly Gly Val Lys Leu Glu Ser Thr Ile Val Val Ser Gly Leu Glu Asp
 50 55 60
 Ala Ala Ala Val Asp Phe Gln Phe Ser Lys Gly Ala Val Tyr Trp Thr
 65 70 75 80
 Asp Val Ser Glu Glu Ala Ile Lys Gln Thr Tyr Leu Asn Gln Thr Gly
 85 90 95
 Ala Ala Val Gln Asn Val Val Ile Ser Gly Leu Val Ser Pro Asp Gly
 100 105 110
 Leu Ala Cys Asp Trp Val Gly Lys Lys Leu Tyr Trp Thr Asp Ser Glu
 115 120 125
 Thr Asn Arg Ile Glu Val Ala Asn Leu Asn Gly Thr Ser Arg Lys Val
 130 135 140
 Leu Phe Trp Gln Asp Leu Asp Gln Pro Lys Ala Ile Ala Leu Asp Pro
 145 150 155 160
 Ala His Gly Tyr Met Tyr Trp Thr Asp Trp Val Glu Thr Pro Arg Ile
 165 170 175

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Arg | Ala | Gly | Met | Asp | Gly | Ser | Thr | Arg | Lys | Ile | Ile | Val | Asp | Ser | 180 | 185 | 190 |
| Asp | Ile | Tyr | Trp | Pro | Asn | Gly | Leu | Thr | Ile | Asp | Leu | Glu | Glu | Gln | Lys | 195 | 200 | 205 |
| Leu | Tyr | Trp | Ala | Asp | Ala | Lys | Leu | Ser | Phe | Ile | His | Arg | Ala | Asn | Leu | 210 | 215 | 220 |
| Asp | Gly | Ser | Phe | Arg | Gln | Lys | Val | Val | Glu | Gly | Ser | Leu | Thr | His | Pro | 225 | 230 | 235 |
| Phe | Ala | Leu | Thr | Leu | Ser | Gly | Asp | Thr | Leu | Tyr | Trp | Thr | Asp | Trp | Gln | 245 | 250 | 255 |
| Thr | Arg | Ser | Ile | His | Ala | Cys | Asn | Lys | Arg | Thr | Gly | Gly | Lys | Arg | Lys | 260 | 265 | 270 |
| Glu | Ile | Leu | Ser | Ala | Leu | Tyr | Ser | Pro | Met | Asp | Ile | Gln | Val | Leu | Ser | 275 | 280 | 285 |
| Gln | Glu | Arg | Gln | Pro | Phe | Phe | His | Thr | Arg | Cys | Glu | Glu | Asp | Asn | Gly | 290 | 295 | 300 |
| Gly | Trp | Ser | His | Leu | Cys | Leu | Leu | Ser | Pro | Ser | Glu | Pro | Phe | Tyr | Thr | 305 | 310 | 315 |
| Cys | Ala | Cys | Pro | Thr | Gly | Val | Gln | Met | Gln | Asp | Asn | Gly | Arg | Thr | Cys | 325 | 330 | 335 |
| Lys | Ala | Gly | Ala | Glu | Glu | Val | Leu | Leu | Leu | Ala | Arg | Arg | Thr | Asp | Leu | 340 | 345 | 350 |
| Arg | Arg | Ile | Ser | Leu | Asp | Thr | Pro | Asp | Phe | Thr | Asp | Ile | Val | Leu | Gln | 355 | 360 | 365 |
| Val | Asp | Asp | Ile | Arg | His | Ala | Ile | Ala | Ile | Asp | Tyr | Asp | Pro | Leu | Glu | 370 | 375 | 380 |
| Gly | Tyr | Val | Tyr | Trp | Thr | Asp | Asp | Glu | Val | Arg | Ala | Ile | Arg | Arg | Ala | 385 | 390 | 395 |
| Tyr | Leu | Asp | Gly | Ser | Gly | Ala | Gln | Thr | Leu | Val | Asn | Thr | Glu | Ile | Asn | 405 | 410 | 415 |
| Asp | Pro | Asp | Gly | Ile | Ala | Val | Asp | Trp | Val | Ala | Arg | Asn | Leu | Tyr | Trp | 420 | 425 | 430 |
| Thr | Asp | Thr | Gly | Thr | Asp | Arg | Ile | Glu | Val | Thr | Arg | Leu | Asn | Gly | Thr | 435 | 440 | 445 |
| Ser | Arg | Lys | Ile | Leu | Val | Ser | Glu | Asp | Leu | Asp | Glu | Pro | Arg | Ala | Ile | 450 | 455 | 460 |
| Ala | Leu | His | Pro | Val | Met | Gly | Leu | Met | Tyr | Trp | Thr | Asp | Trp | Gly | Glu | 465 | 470 | 475 |
| Asn | Pro | Lys | Ile | Glu | Cys | Ala | Asn | Leu | Asp | Gly | Gln | Glu | Arg | Arg | Val | 485 | 490 | 495 |
| Leu | Val | Asn | Ala | Ser | Leu | Gly | Trp | Pro | Asn | Gly | Leu | Ala | Leu | Asp | Leu | 500 | 505 | 510 |
| Gln | Glu | Gly | Lys | Leu | Tyr | Trp | Gly | Asp | Ala | Lys | Thr | Asp | Lys | Ile | Glu | 515 | 520 | 525 |
| Val | Ile | Asn | Val | Asp | Gly | Thr | Lys | Arg | Arg | Thr | Leu | Leu | Glu | Asp | Lys | 530 | 535 | 540 |
| Leu | Pro | His | Ile | Phe | Gly | Phe | Thr | Leu | Leu | Gly | Asp | Phe | Ile | Tyr | Trp | 545 | 550 | 555 |
| Thr | Asp | Trp | Gln | Arg | Arg | Ser | Ile | Glu | Arg | Val | His | Lys | Val | Lys | Ala | 565 | 570 | 575 |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Arg | Asp | Val | Ile | Ile | Asp | Gln | Leu | Pro | Asp | Leu | Met | Gly | Leu | Lys | 580 | 585 | 590 |
| Ala | Val | Asn | Val | Ala | Lys | Val | Val | Gly | Thr | Asn | Pro | Cys | Ala | Asp | Arg | 595 | 600 | 605 |
| Asn | Gly | Gly | Cys | Ser | His | Leu | Cys | Phe | Phe | Thr | Pro | His | Ala | Thr | Arg | 610 | 615 | 620 |
| Cys | Gly | Cys | Pro | Ile | Gly | Leu | Glu | Leu | Leu | Ser | Asp | Met | Lys | Thr | Cys | 625 | 630 | 635 |
| Ile | Val | Pro | Glu | Ala | Phe | Leu | Val | Phe | Thr | Ser | Arg | Ala | Ala | Ile | His | 645 | 650 | 655 |
| Arg | Ile | Ser | Leu | Glu | Thr | Asn | Asn | Asn | Asp | Val | Ala | Ile | Pro | Leu | Thr | 660 | 665 | 670 |
| Gly | Val | Lys | Glu | Ala | Ser | Ala | Leu | Asp | Phe | Asp | Val | Ser | Asn | Asn | His | 675 | 680 | 685 |
| Ile | Tyr | Trp | Thr | Asp | Val | Ser | Leu | Lys | Asn | Ile | Ser | Arg | Ala | Phe | Met | 690 | 695 | 700 |
| Asn | Gly | Ser | Ser | Val | Glu | His | Val | Val | Glu | Phe | Gly | Leu | Asp | Tyr | Pro | 705 | 710 | 715 |
| Glu | Gly | Met | Ala | Val | Asp | Trp | Met | Gly | Lys | Asn | Leu | Tyr | Trp | Ala | Asp | 725 | 730 | 735 |
| Thr | Gly | Thr | Asn | Arg | Ile | Glu | Val | Ala | Arg | Leu | Asp | Gly | Gln | Phe | Arg | 740 | 745 | 750 |
| Gln | Val | Leu | Val | Trp | Arg | Asp | Leu | Asp | Asn | Pro | Arg | Ser | Leu | Ala | Leu | 755 | 760 | 765 |
| Asp | Pro | Thr | Lys | Gly | Tyr | Ile | Tyr | Trp | Thr | Glu | Trp | Gly | Gly | Lys | Pro | 770 | 775 | 780 |
| Arg | Ile | Val | Arg | Ala | Phe | Met | Asp | Gly | Thr | Asn | Cys | Met | Thr | Leu | Val | 785 | 790 | 795 |
| Asp | Lys | Val | Gly | Arg | Ala | Asn | Asp | Leu | Thr | Ile | Asp | Tyr | Ala | Asp | Gln | 805 | 810 | 815 |
| Arg | Leu | Tyr | Trp | Thr | Asp | Leu | Asp | Thr | Asn | Met | Ile | Glu | Ser | Ser | Asn | 820 | 825 | 830 |
| Met | Leu | Gly | Gln | Glu | Arg | Val | Val | Ile | Ala | Asp | Asp | Leu | Pro | His | Pro | 835 | 840 | 845 |
| Phe | Gly | Leu | Thr | Gln | Tyr | Ser | Asp | Tyr | Ile | Tyr | Trp | Thr | Asp | Trp | Asn | 850 | 855 | 860 |
| Leu | His | Ser | Ile | Glu | Arg | Ala | Asp | Lys | Thr | Ser | Gly | Arg | Asn | Arg | Thr | 865 | 870 | 875 |
| Leu | Ile | Gln | Gly | His | Leu | Asp | Phe | Val | Met | Asp | Ile | Leu | Val | Phe | His | 885 | 890 | 895 |
| Ser | Ser | Arg | Gln | Asp | Gly | Leu | Asn | Asp | Cys | Met | His | Asn | Asn | Gly | Gln | 900 | 905 | 910 |
| Cys | Gly | Gln | Leu | Cys | Leu | Ala | Ile | Pro | Gly | Gly | His | Arg | Cys | Gly | Cys | 915 | 920 | 925 |
| Ala | Ser | His | Tyr | Thr | Leu | Asp | Pro | Ser | Ser | Arg | Asn | Cys | Ser | Pro | Pro | 930 | 935 | 940 |
| Thr | Thr | Phe | Leu | Leu | Phe | Ser | Gln | Lys | Ser | Ala | Ile | Ser | Arg | Met | Ile | 945 | 950 | 955 |
| Pro | Asp | Asp | Gln | His | Ser | Pro | Asp | Leu | Ile | Leu | Pro | Leu | His | Gly | Leu | 965 | 970 | 975 |

Arg Asn Val Lys Ala Ile Asp Tyr Asp Pro Leu Asp Lys Phe Ile Tyr
 980 985 990
 Trp Val Asp Gly Arg Gln Asn Ile Lys Arg Ala Lys Asp Asp Gly Thr
 995 1000 1005
 Gln Pro Phe Val Leu Thr Ser Leu Ser Gln Gly Gln Asn Pro Asp Arg
 1010 1015 1020
 Gln Pro His Asp Leu Ser Ile Asp Ile Tyr Ser Arg Thr Leu Phe Trp
 1025 1030 1035 1040
 Thr Cys Glu Ala Thr Asn Thr Ile Asn Val His Arg Leu Ser Gly Glu
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 Ala Met Gly Val Val Leu Arg Gly Asp Arg Asp Lys Pro Arg Ala Ile
 1060 1065 1070
 Val Val Asn Ala Glu Arg Gly Tyr Leu Tyr Phe Thr Asn Met Gln Asp
 1075 1080 1085
 Arg Ala Ala Lys Ile Glu Arg Ala Ala Leu Asp Gly Thr Glu Arg Glu
 1090 1095 1100
 Val Leu Phe Thr Thr Gly Leu Ile Arg Pro Val Ala Leu Val Val Asp
 1105 1110 1115 1120
 Asn Thr Leu Gly Lys Leu Phe Trp Val Asp Ala Asp Leu Lys Arg Ile
 1125 1130 1135
 Glu Ser Cys Asp Leu Ser Gly Ala Asn Arg Leu Thr Leu Glu Asp Ala
 1140 1145 1150
 Asn Ile Val Gln Pro Leu Gly Leu Thr Ile Leu Gly Lys His Leu Tyr
 1155 1160 1165
 Trp Ile Asp Arg Gln Gln Gln Met Ile Glu Arg Val Glu Lys Thr Thr
 1170 1175 1180
 Gly Asp Lys Arg Thr Arg Ile Gln Gly Arg Val Ala His Leu Thr Gly
 1185 1190 1195 1200
 Ile His Ala Val Glu Glu Val Ser Leu Glu Glu Phe Ser Ala His Pro
 1205 1210 1215
 Cys Ala Arg Asp Asn Gly Gly Cys Ser His Ile Cys Ile Ala Lys Gly
 1220 1225 1230
 Asp Gly Thr Pro Arg Cys Ser Cys Pro Val His Leu Val Leu Leu Gln
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 Asn Leu Leu Thr Cys Gly Glu Pro Pro Thr Cys Ser Pro Asp Gln Phe
 1250 1255 1260
 Ala Cys Ala Thr Gly Glu Ile Asp Cys Ile Pro Gly Ala Trp Arg Cys
 1265 1270 1275 1280
 Asp Gly Phe Pro Glu Cys Asp Asp Gln Ser Asp Glu Glu Gly Cys Pro
 1285 1290 1295
 Val Cys Ser Ala Ala Gln Phe Pro Cys Ala Arg Gly Gln Cys Val Asp
 1300 1305 1310
 Leu Arg Leu Arg Cys Asp Gly Glu Ala Asp Cys Gln Asp Arg Ser Asp
 1315 1320 1325
 Glu Val Asp Cys Asp Ala Ile Cys Leu Pro Asn Gln Phe Arg Cys Ala
 1330 1335 1340
 Ser Gly Gln Cys Val Leu Ile Lys Gln Gln Cys Asp Ser Phe Pro Asp
 1345 1350 1355 1360
 Cys Ile Asp Gly Ser Asp Glu Leu Met Cys Glu Ile Thr Lys Pro Pro
 1365 1370 1375

Ser Asp Asp Ser Pro Ala His Ser Ser Ala Ile Gly Pro Val Ile Gly
 1380 1385 1390
 Ile Ile Leu Ser Leu Phe Val Met Gly Gly Val Tyr Phe Val Cys Gln
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 Arg Val Val Cys Gln Arg Tyr Ala Gly Ala Asn Gly Pro Phe Pro His
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 Glu Tyr Val Ser Gly Thr Pro His Val Pro Leu Asn Phe Ile Ala Pro
 1425 1430 1435 1440
 Gly Gly Ser Gln His Gly Pro Phe Thr Gly Ile Ala Cys Gly Lys Ser
 1445 1450 1455
 Met Met Ser Ser Val Ser Leu Met Gly Gly Arg Gly Gly Val Pro Leu
 1460 1465 1470
 Tyr Asp Arg Asn His Val Thr Gly Ala Ser Ser Ser Ser Ser Ser
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| ggcaacgtgg gggaacgagc cacctacccc tccactgaat tgccctgggg tgtgggtacc | 180 |
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<220>

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<223> Identity of nucleotide sequences at the above locations are unknown.

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| actcttctctg | agtagccgga | ttacaggcgc | acgcaccatg | cctggctaatt | tattttgttt | 64440 |
| ttttagtaga | gacagggttt | cgccacgttg | cccaggctgg | tcttgaatcc | ctggcctcaa | 64500 |
| gogatccgcc | cgctcagcc | tcccaaagtg | ctgggattac | aggcgtgagc | caccgtgccc | 64560 |
| gcccagccta | gggttacatg | aaactttttt | tttttttttt | ttgagacaga | gtttcactct | 64620 |
| gtcctcaggc | tggagtgcag | tggcgtgatc | tcggcgtaact | gcaatctccg | cctcccgggt | 64680 |
| caagcgattc | tcctgcctca | gcctcccag | tagctgggat | tgcaggcacg | cgccaccaca | 64740 |
| cccagctaatt | ttttgtattt | ttagtagaga | cggtctttca | ccatgtggga | caggatggct | 64800 |
| togatctcct | gacctcgtga | tcgcgccgcc | tcagcctccg | aaagtgtctg | gattacaggc | 64860 |
| ctgagccacc | gtgcccagcc | atgatgtttt | gatacaggca | tataacgtat | aataatcaca | 64920 |
| tcagggtaaa | tgatgtaacc | atcacatcaa | gcatttatcc | tttgtgttac | aaaaaaaaat | 64980 |
| ctaattatac | tttctacttt | attctttttt | tttttttttt | ttgagacgga | gtctccctca | 65040 |
| gtcgcaccag | ctggagtgca | gtggcatgat | ctcagttcac | tgcagctctc | gcctcctagc | 65100 |
| tctgcctcct | gggttcattg | cattctcctg | tctcagcctc | gcgagttagct | gggactacag | 65160 |
| gcgcctgcca | ccgtgcccgg | ctaatttttt | tttttgtatt | tttggttagag | acagggtttc | 65220 |
| accgtgttag | ccaggatggt | ctcgatctcc | tgacctcata | atccgcccg | ctcggcctcc | 65280 |
| caaagtgtctg | ggattacagg | catgagccac | cgccccagc | ctattttattc | ttaaatgtac | 65340 |
| aataaattat | tgttgactcc | agtcaccctg | ctgtgctacc | aaatacggat | cttcttcatt | 65400 |
| ctatctaact | gtatttctgt | acctgttaac | catctctcct | ccacctcacc | ccccaaacct | 65460 |
| actacccttc | tcagcctctg | gtaaccatcc | ttctactctc | tatctctatg | agttcaattg | 65520 |
| tattaatttt | tagtcccccg | gccgggcacg | gtggctcacg | cctgtaatcc | cagcacttca | 65580 |
| ggaggctgag | gcagggtgat | cacgaggtca | ggagtttgag | accagcctgg | ccaacatggt | 65640 |
| ggaaccccat | ctctactaaa | aacacaaaaa | ttagctgggc | gtgggtgggtg | gcgctttag | 65700 |
| tcccagctac | ttgggaggct | gaggcaggag | aatcgcttga | aactgggagg | cagaggttgc | 65760 |
| agtgagccaa | gattgcgcca | ctgcactcca | gtctgggtga | cagagtaaga | ttccatcccc | 65820 |
| aaaaaaaaaa | agtttagctc | ccacaaataa | gtgagaacac | gtgaagtttc | tctttctgtg | 65880 |
| cctcgcttgt | ttcacttaac | ataatgacct | ccagttccat | ccacgttgtt | gctttgttat | 65940 |
| aaatgacagg | atcttgggtca | ggcgaggtgg | ctcatgcctg | taatcccagc | actttgggag | 66000 |

| | |
|--|-------|
| gctgaggtgg actgatcatg aggtcaagag atcgagacca tcctgggctaa cacagtga | 66060 |
| ccccgtctct actaaaaata caagaaatta gccgggcgtg gtggtgggca cccatttc | 66120 |
| ccccctctcg ggacgctgat gcacgacata ttacccatcc ccggaagact aatcctccc | 66180 |
| cactctatat tgtacctctt cctttctcct ccacgcgatt ccccgagtaa cccgtcttc | 66240 |
| ctccctctc ggattacgt cacctttccg cttcaatcac gttgctcgt ccccttccc | 66300 |
| attcgtaaca ctctcactt tcgtcttct accccacta tcccttttcg tctctctat | 66360 |
| tccttactta ctctccccc ttctcttcat acttcattcc ctccgctctt cccactcgc | 66420 |
| ctccacttt cacctagttg ccctcaccta cgttgccatc tcgcccctt ttcagctctc | 66480 |
| ggcctctcac ccatctgtcc tctctcttac ctctctcctc atctcgtca gacatctctc | 66540 |
| tagactatcc ctcaactttac cttctcagtc gtcttcttcc tatecttcgt tctccatgat | 66600 |
| cttcacgctg ccatctcttt tcgccccttt catatgtctc tcttcatgtt ctcaatatca | 66660 |
| ttctcatgat cactatcgtt ctcaactatt atcaactccc tctttcttca tcaattctc | 66720 |
| tcggtcattc tcgtctctct cttacaaccg ccttcttgt gctatctaac tcaaccatgc | 66780 |
| ctctctact ctctctctat cgcccctcca tcgcttatgc atcctcttct attgcacacc | 66840 |
| cgcccctcca tcgcttatgc atcctcttct attgcacacc gccctccat cgcttatgca | 66900 |
| tcctcttcta ttgcacatcc tcttctattg cac | 66933 |

<210> 12

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Artificial sequence is a primer.

<400> 12

| | |
|-------------------------|----|
| ctgagcggaa ttcgtgagac c | 21 |
|-------------------------|----|

<210> 13

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Artificial sequence is a primer.

<400> 13

| | |
|---------------------------|----|
| ttggtctcac gtattccgct cga | 23 |
|---------------------------|----|

<210> 14

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Artificial sequence is a primer.

<400> 14

| | |
|-----------------------|----|
| ctcgagaatt ctggatcctc | 20 |
|-----------------------|----|

<210> 15
 <211> 22
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Artificial sequence is a primer.

 <400> 15
 ttgaggatcc agaattctcg ag 22

 <210> 16
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Artificial sequence is a primer.

 <400> 16
 tgtatgcgaa ttcgctgcgc g 21

 <210> 17
 <211> 23
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Artificial sequence is a primer.

 <400> 17
 ttcgcgcagc gaattcgcat aca 23

 <210> 18
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Artificial sequence is a primer.

 <400> 18
 gtccactgaa ttctcagtga g 21

 <210> 19
 <211> 23
 <212> DNA
 <213> Artificial Sequence

 <220>

<223> Artificial sequence is a primer.

<400> 19
 ttgtcactga gaattcagtg gac 23

<210> 20
 <211> 21
 <212> DNA
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<220>
 <223> Artificial sequence is a primer.

<400> 20
 gaatccgaat tcctggtcag c 21

<210> 21
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 <212> DNA
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<220>
 <223> Artificial sequence is a primer.

<400> 21
 ttgctgacca ggaattcgga ttc 23

<210> 22
 <211> 33
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Artificial sequence is a primer.

<400> 22
 cuacuacuac uactgagcgg aattcgtgag acc 33

<210> 23
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Artificial sequence is a primer.

<400> 23
 cuacuacuac uactcgagaa ttctggatcc tc 32

<210> 24

<211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Artificial sequence is a primer.

 <400> 24
 cuacuacuac uatgtatgcg aattcgctgc gcg 33

 <210> 25
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Artificial sequence is a primer.

 <400> 25
 cuacuacuac uagtccactg aattctcagt gag 33

 <210> 26
 <211> 33
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Artificial sequence is a primer.

 <400> 26
 cuacuacuac uagaatccga attcctgggc agc 33

 <210> 27
 <211> 45
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Artificial sequence is a primer.

 <400> 27
 aactggaaga attcgcggcc gcaggaattt tttttttttt ttttt 45

 <210> 28
 <211> 13
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Artificial sequence is a primer.

| | |
|--|----|
| <400> 28 aattcggcac gag | 13 |
| <210> 29 <211> 9 <212> DNA <213> Artificial Sequence | |
| <220> <223> Artificial sequence is a primer. | |
| <400> 29 ctcgtgccg | 9 |
| <210> 30 <211> 14 <212> DNA <213> Artificial Sequence | |
| <220> <223> Artificial sequence is a primer. | |
| <400> 30 gtacgacggc cagt | 14 |
| <210> 31 <211> 16 <212> DNA <213> Artificial Sequence | |
| <220> <223> Artificial sequence is a primer. | |
| <400> 31 aacagctatg accatg | 16 |
| <210> 32 <211> 18 <212> DNA <213> Artificial Sequence | |
| <220> <223> Artificial sequence is a primer. | |
| <400> 32 ccaagttctg agaagtcc | 18 |
| <210> 33 <211> 20 <212> DNA | |

<213> Artificial Sequence

<220>

<223> Artificial sequence is a primer.

<400> 33
aatacctgaa accatacctg 20

<210> 34
<211> 57
<212> DNA
<213> Artificial Sequence

<220>

<223> Artificial sequence is a primer.

<400> 34
agctgctcgt agctgtctct ccctggatca cgggtacatg tactggacag actgggt 57

<210> 35
<211> 56
<212> DNA
<213> Artificial Sequence

<220>

<223> Artificial sequence is a primer.

<400> 35
tgagacgccc ggattgagcg ggcagggata gcttattccc tgtgccgcat tacggc 56

<210> 36
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> Artificial sequence is a primer.

<400> 36
agctgctcgt agctgtctct ccctgga 27

<210> 37
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> Artificial sequence is a primer.

<400> 37

gccgtaatgc ggcacagga ataagct 27

<210> 38
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Artificial sequence is a primer.

<400> 38
 gagaggctat atccctgggc 20

<210> 39
 <211> 20
 <212> DNA
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<220>
 <223> Artificial sequence is a primer.

<400> 39
 acagcacgtg tttaaagggg 20

<210> 40
 <211> 163
 <212> DNA
 <213> Homo sapiens

<400> 40
 actaaagcgc cgccgccgcg ccatggagcc cgagtgaact cgccgccggc ccgtccggcc 60
 gccggacaac atggaggcag ctccgcccg gcccgcgtgg ccgctgctgc tgctgctgct 120
 gctgctgctg gcgctgtgcg gctgcccggc cccgccgcg gcc 163

<210> 41
 <211> 419
 <212> DNA
 <213> Homo sapiens

<400> 41
 gccccacagc ctgcgcgctc ctgctatttg ccaaccgccg ggacgtacgg ctggtggacg 60
 ccggcggagt caagctggag tccaccatcg tggtcagcgg cctggaggat gcggccgcag 120
 tggacttcca gttttccaag ggagccgtgt actggacaga cgtgagcgag gaggccatca 180
 agcagacctc cctgaaccag acggggggccg ccgtgcagaa cgtgggtcatc tccggcctgg 240
 tctctcccga cggcctcgcc tgcgactggg tgggcaagaa gctgtactgg acggactcag 300
 agaccaaccg catcgagggt gccaacctca atggcacatc ccggaagggt ctcttctggc 360
 aggaccttga ccagccgagg gccatcgcc tggaccccgc tcacgggtaa accctgctg 419

<210> 42
 <211> 221

<212> DNA

<213> Homo sapiens

<400> 42

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| ccccgtcaca | ggtacatgta | ctggacagac | tggggtgaga | cgccccggat | tgagcgggca | 60 |
| gggatggatg | gcagcaccgc | gaagatcatt | gtggactcgg | acatttactg | gccaatgga | 120 |
| ctgaccatcg | acctggagga | gcagaagctc | tactgggctg | acgccaagct | cagcttcac | 180 |
| caccgtgcca | acctggacgg | ctcgttccgg | taggtacca | c | | 221 |

<210> 43

<211> 221

<212> DNA

<213> Homo sapiens

<400> 43

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| tccctgactg | caggcagaag | gtggtggagg | gcagcctgac | gcaccccttc | gccctgacgc | 60 |
| tctccgggga | cactctgtac | tggacagact | ggcagaccgc | ctccatccat | gcctgcaaca | 120 |
| agcgactgg | ggggaagagg | aaggagatcc | tgagtgcct | atactaccc | atggacatcc | 180 |
| aggtgctgag | ccaggagcgg | cagccttttt | gtgagtgccg | g | | 221 |

<210> 44

<211> 156

<212> DNA

<213> Homo sapiens

<400> 44

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| tttctcagtc | cacactcgct | gtgaggagga | caatggcggc | tggtcccacc | tgtgcctgct | 60 |
| gtccccaagc | gagccttttt | acacatgcgc | ctgccccacg | ggtgtgcaga | tgcaggacaa | 120 |
| cggcaggacg | tgtaaggcag | gtgaggcggt | gggacg | | | 156 |

<210> 45

<211> 416

<212> DNA

<213> Homo sapiens

<400> 45

| | | | | | | |
|------------|-------------|------------|-------------|------------|------------|-----|
| ctccacagga | gccgaggagg | tgctgctgct | ggccccggcg | acggacctac | ggaggatctc | 60 |
| gctggacacg | ccggacttca | ccgacatcgt | gctgcagggt | gacgacatcc | ggcacgccat | 120 |
| tgccatcgac | tacgaccgc | tagagggcta | tgtctactgg | acagatgacg | aggtgcgggc | 180 |
| catccgcagg | gcgtacctgg | acgggtctgg | ggcgacagcg | ctggtcaaca | ccgagatcaa | 240 |
| cgaccccgat | ggcatcgcg | tcgactgggt | ggccccgaaac | ctctactgga | ccgacacggg | 300 |
| cacggaccgc | atcgagggtga | cgcgcctcaa | cggcacctcc | cgcaagatcc | tggtgtcgga | 360 |
| ggacctggac | gagccccgag | ccatcgact | gcaccccgctg | atggggtaag | acgggc | 416 |

<210> 46

<211> 198

<212> DNA

<213> Homo sapiens

<400> 46

| | | | | | | |
|-------------|------------|------------|------------|------------|------------|-----|
| ttctttctcca | gcctcatgta | ctggacagac | tggggagaga | accctaaaat | cgagtgtgcc | 60 |
| aacttgatg | ggcaggagcg | gcgtgtgctg | gtcaatgcct | ccctcgggtg | gccaacggc | 120 |
| ctggccctgg | acctgcagga | ggggaagctc | tactggggag | acgccaagac | agacaagatc | 180 |
| gaggtgaggc | tcctgtgg | | | | | 198 |

<210> 47
 <211> 244
 <212> DNA
 <213> Homo sapiens

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| <400> 47 | | | | | | |
| ccgtcctgca | ggtgatcaat | gttgatggga | cgaagaggcg | gaccctcctg | gaggacaagc | 60 |
| tccgcacat | tttcgggttc | acgctgctgg | gggacttcat | ctactggact | gactggcagc | 120 |
| gccgcagcat | cgagcgggtg | cacaaggtca | aggccagccg | ggacgtcatc | attgaccagc | 180 |
| tgcccgaact | gatggggctc | aaagctgtga | atgtggccaa | ggtcgtcggg | gagtcggggg | 240 |
| ggtc | | | | | | 244 |

<210> 48
 <211> 313
 <212> DNA
 <213> Homo sapiens

| | | | | | | |
|------------|------------|-------------|-------------|-------------|------------|-----|
| <400> 48 | | | | | | |
| gttcgcttcc | aggaaccaac | ccgtgtgcgg | acaggaacgg | gggggtgcagc | cacctgtgct | 60 |
| tctgcacacc | ccacgcaacc | cgggtgtggct | gccccatcgg | cctggagctg | ctgagtgaca | 120 |
| tgaagacctg | catcgtgcct | gaggccctttt | tggctcttcac | cagcagagcc | gccatccaca | 180 |
| ggatctccct | cgagaccaat | aacaacgacg | tggccatccc | gctcacgggc | gtcaaggagg | 240 |
| cctcagccct | ggactttgat | gtgtccaaca | accacatcta | ctggacagac | gtcagcctga | 300 |
| aggtagcgtg | ggc | | | | | 313 |

<210> 49
 <211> 255
 <212> DNA
 <213> Homo sapiens

| | | | | | | |
|------------|------------|------------|------------|-------------|------------|-----|
| <400> 49 | | | | | | |
| cctgctgcca | gaccatcagc | cgcgccttca | tgaacgggag | ctcgggtggag | cacgtggtgg | 60 |
| agtttggcct | tgactacccc | gagggcatgg | ccgttgactg | gatgggcaag | aacctctact | 120 |
| gggccgacac | tgggaccaac | agaatcgaag | tggcgcggct | ggacgggcag | ttccggcaag | 180 |
| tcctcgtgtg | gagggacttg | gacaacccga | ggtcgctggc | cctggatccc | accaaggggt | 240 |
| aagtgtttgc | ctgtc | | | | | 255 |

<210> 50
 <211> 210
 <212> DNA
 <213> Homo sapiens

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| <400> 50 | | | | | | |
| gtgccttcca | gctacatcta | ctggaccgag | tggggcggca | agccgaggat | cgtgcggggc | 60 |
| ttcatggacg | ggaccaactg | catgacgctg | gtggacaagg | tgggccgggc | caacgacctc | 120 |

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| accattgact | acgetgacca | gcgcctctac | tggaccgacc | tggacaccaa | catgatcgag | 180 |
| tcgtccaaca | tgctgggtga | gggcccgggt | | | | 210 |

<210> 51
 <211> 352
 <212> DNA
 <213> Homo sapiens

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| <400> 51 | | | | | | |
| gtgttcacgc | aggtcaggag | cgggtcgtga | ttgccgacga | tctcccgac | ccgttcgggc | 60 |
| tgacgcagta | cagcgattat | atctactgga | cagactggaa | tctgcacagc | attgagcggg | 120 |
| ccgacaagac | tagcggccgg | aaccgcaccc | tcattccagg | ccacctggac | ttcgtgatgg | 180 |
| acatcctggg | gttccactcc | tcccgcagg | atggcctcaa | tgactgtatg | cacaacaacg | 240 |
| ggcagtgtgg | gcagctgtgc | cttgccatcc | ccggcgggca | ccgctgcggc | tgccctcac | 300 |
| actacacct | ggaccccagc | agccgcaact | gcagccgtaa | gtgcctcatg | gt | 352 |

<210> 52
 <211> 225
 <212> DNA
 <213> Homo sapiens

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| <400> 52 | | | | | | |
| gcctcctcta | cgcccaccac | cttcttgctg | ttcagccaga | aatctgcat | cagtcggatg | 60 |
| atcccggacg | accagcacag | cccggatctc | atcctgcccc | tgcatggact | gaggaacgtc | 120 |
| aaagccatcg | actatgacct | actggacaag | ttcatctact | gggtggatgg | gcgccagaac | 180 |
| atcaagcgag | ccaaggacga | cgggacccag | gcaggtgccc | tgtgg | | 225 |

<210> 53
 <211> 235
 <212> DNA
 <213> Homo sapiens

| | | | | | | |
|-------------|------------|------------|------------|------------|------------|-----|
| <400> 53 | | | | | | |
| ctttgtctta | cagccctttg | ttttgacctc | tctgagccaa | ggccaaaacc | cagacaggca | 60 |
| gccccacgac | ctcagcatcg | acatctacag | ccggacactg | ttctggacgt | gcgaggccac | 120 |
| caataaccatc | aacgtccaca | ggctgagcgg | ggaagccatg | gggtgggtgc | tgctggggga | 180 |
| ccgcgacaag | cccagggcca | tcgtcgtcaa | cgcgagcgca | gggtaggagg | ccaac | 235 |

<210> 54
 <211> 218
 <212> DNA
 <213> Homo sapiens

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| <400> 54 | | | | | | |
| ccacctccc | gcaggtacct | gtacttcacc | aacatgcagg | accgggcagc | caagatcgaa | 60 |
| cgcgcagccc | tggacggcac | cgagcgcgag | gtcctcttca | ccaccggcct | catccgccct | 120 |
| gtggccctgg | tggtggacaa | cacactgggc | aagctgttct | gggtggacgc | ggacctgaag | 180 |
| cgcattgaga | gctgtgacct | gtcaggtacg | cgccccgg | | | 218 |

<210> 55

<211> 234
 <212> DNA
 <213> Homo sapiens

<400> 55
 ggctgcttgc agggggccaac cgcttgaccc tggaggacgc caacatcgtg cagcctctgg 60
 gcctgaccat ccttggcaag catctctact ggatcgaccg ccagcagcag atgatcgagc 120
 gtgtggagaa gaccaccggg gacaagcgga ctgcgcatcca gggccgtgtc gcccacctca 180
 ctggcatcca tgcagtggag gaagtcagcc tggaggagtt ctgtacgtgg gggc 234

<210> 56
 <211> 157
 <212> DNA
 <213> Homo sapiens

<400> 56
 ttgtctttgc agcagcccac ccatgtgccc gtgacaatgg tggctgctcc cacatctgta 60
 ttgccaaggg tgatgggaca ccacgggtgt catgcccagt ccacctcgtg ctcttcgaga 120
 acctgctgac ctgtggaggt aggtgtgacc taggtgc 157

<210> 57
 <211> 272
 <212> DNA
 <213> Homo sapiens

<400> 57
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 cacaggggag atcgactgta tccccggggc ctggcgctgt gacggctttc ccgagtgcga 120
 tgaccagagc gacgaggagg gctgccccgt gtgtcccgcc gccagttcc cctgcgcgcg 180
 gggtcagtgt gtggacctgc gctgcgctg cgacggcgag gcagactgtc aggaccgctc 240
 agacgaggtg gactgtgacg gtgaggccct cc 272

<210> 58
 <211> 134
 <212> DNA
 <213> Homo sapiens

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